VOLUME V NOVEMBER, 1914 NUMBER 9

THE JOURNAL OF EDUCATIONAL PSYCHOLOGY

EDUCATIONAL RESEARCH IN NEW ORLEANS.

DAVID SPENCE HILL, PH. D.,

Director Division of Educational Research, New Orleans Public Schools.

In the establishment of an organization for research within the public schools of New Orleans, it seemed best not to limit too narrowly by rule or name the scope of the proposed investigations. The specific problems to be undertaken were left largely to the judgment of the Superintendent of Schools and the Director of Research. Bureaus of statistics, psychological clinics, survey work and special investigations are all good; but each of the phases of study indicated in these names can be undertaken beneficially by a properly organized "division of research," in the hands of trained men and women who possess a constructive spirit toward the existing educational systems of city and state. We would not give the impression that during the past year mistakes have not been made, that no time was lost by reason of false starts, or no disappointment has been met in the failure to complete certain tasks which appeared at the outset invitingly brief, or that administrative action in following up recommendations has been always prompt or logical. We also know that in the future the work may collapse because of failure of appropriations, or by possible political machination, or even by the undermining work of a few unworthy academic schemers. This

is the dark side of such an enterprise in a typical American city. It is a matter for felicitation, however, that with a rather meagre paid-staff we have been able to attack helpfully some four groups of problems for the school and city authorities. Although the school year, 1913-1914, has been a strenuous one, the writer nevertheless is grateful because of the industry and loyalty of his assistants and colleagues, and for the courteous and open-minded attitude of Superintendent Joseph M. Gwinn, and of the present city and school officials.

One might write at length about minimum requisites in the organization, conduct, control and financing of such a department. Even more could be written about the requisites of an ideal department of educational research. In outlining the work of the past year we must confine this article to a succinct statement of the problems accepted, the methods of attack adopted and the results so far obtained. The activities of the year may be classified under four different but nevertheless related subjects, as follows:

I. Vocational and educational survey, preparatory to the establishment of the Isaac Delgado Central Trades School for Boys. For the actual establishment of this institution the benevolence of Mr. Delgado has made available to the city some $800,000.

II. Group analyses by statistical methods of certain conditions in each grade of each public elementary school of New Orleans.

III. Individual studies of exceptional children from the public schools through organized co-operation of psychologist, physicians, social investigator, parents, teacher and superintendent.

IV. Application of this method of individual study to special groups, as juvenile delinquents confined by the city.

Frequent inquiries are coming to the writer concerning various aspects either of the methods or results of our work, and it is difficult to reply adequately to each of these inquiries. It is hoped, therefore, that readers interested in the organization and operation of a department of educational research will find useful the somewhat detailed enumeration of our typical activities, that we shall now proceed to outline.

I. Vocational and Educational Survey.

The vocational survey comprised the major undertaking for the year, and it is not yet complete. The first section of our vocational report entitled, *Part One: Vocational Survey for the Isaac Delgado Central Trades School; Facts About the Public Schools of New Orleans in Relation to Vocation,* has been published by the Commission Council of New Orleans and is now ready for distribution. It is intended to be an introduction to further studies in preparation concerning industries and occupations in New Orleans, and concerning the buildings, equipment and conduct of trades schools in many different parts of the country, schools which have been visited by the writer during the past year.

For these other vocational studies the following efforts have been made:

(a) Two journeys for inspections and conferences were completed. Inspections of trades schools or conferences with men and women conducting schools of this or related types were had in Portland, Oregon; Milwaukee, Wisconsin; St. Louis, Missouri; Chicago and St. Charles, Illinois; Philadelphia, Williamson, and Glen Mills, Pennsylvania; New York City, Pleasantville, Lincolndale, Chauncey, Rochester and Albany, New York; Boston, Westboro and Worcester, Massachusetts. These journeys and conferences, resulting in the collection of data, pictures and plans, and in comparative judgments, were indispensable for our purpose.

(b) Within New Orleans the Director has visited some ninety employers and industries, representative of the manifold business of the city. The purpose here was to obtain at first hand a knowledge of typical local industries, including an insight into the vocational opportunities for youth. On the occasion of each visit notes were made, and incidentally the opportunity was not overlooked to enlist the personal interest and understanding of industrial leaders in the proposed Delgado Trades School for Boys. Memoranda were made concerning such items as numbers and ages of employees, trades employed, processes utilized, minimum and maximum wages, steps of promotion, hours of labor, sanitary conditions,

etc. It is generally agreed in this day of "surveys" that minute statistical analyses may have little practical value in the actual work of articulating the curricula of a trades school to the needs of existing local industries. What is needed, as Director Richards has pointed out, is a cataloguing of the several processes in the industries and occupations under consideration, in order that the availability of instruction in these processes within a trades school may be determined. This remains to be done in New Orleans.

It would be an easy matter, with nearly a million dollars available for a boys' trades school, for us to call in architects and builders, to employ a teaching staff from a host of candidates and designate the result a "trades school." It is our hope to avoid such errors. In a city where a trades school for boys does not already exist, there are many other problems that must be attacked. We need to have definite information about the local schools, about local industries and industries throughout the country, and, finally, we should be able in advance of the establishment of the new institution to profit by the experience of trades schools elsewhere. Such is the opportunity in New Orleans, and, therefore, our general efforts in the vocational survey have been made in this threefold direction.

During a recent conference on industrial education at Cornell University, the writer upon request formulated a list of problems such as confront New Orleans preliminary to the establishment of a boys' trades school. That these problems are varied and complex, the following list shows:

1. Are the *definitions* of aspects, or departments, of industrial education satisfactory, as offered by the National Society for the Promotion of Industrial Education?
2. Where a trades school is to be owned by a city, in whom shall *immediate control* be vested? In a Special Commission? In the School Board? In a Commission including the School Board (when same is small and elective)?
3. What are the determining factors in the wise choice of a *site?*
4. With regard to *structures,* when more than $500,000 is available, what main principles do modern architecture and engineering emphasize, with regard to *materials* (stone, brick, cement, wood, glass, etc.); *unit* system; adaptation to *climatic conditions; power* plants, etc.?

5. Also with regard to *equipment* adapted to trades to be taught? Conventional machines for general purposes, or specialized? *Unit, shaft* or *unit-group* systems?

6. What are the qualifications and where is the best source of *trades-instructors?*

7. Entrance requirements for a *preparatory* trades school?
Entrance requirements for a *practical* trades school?

8. How shall curricula be formulated; *e. g.,* with reference to *machinist* trades, *builders* trades, *printing,* etc.?

9. How may practical and sympathetic *co-operation* be effected between employers and employees, corporations and unions, in behalf of the trades school?

10. What *disposal* should be made of the products of the school?

11. What is the ideal plan of *maintenance?* Shall city, state and federal governments co-operate?

12. Should *tuition* be charged, and on what grounds?

13. What system of *vocational guidance* would be effective?

14. Could a *nautical school* for training of petty officers, mechanics, etc., for merchant marine be made a logical division of a trades school?

15. How may the activities of a modern trades school be articulated practically with industry, and yet be safeguarded as *educational* activities, suited to the physiological and mental needs of youth, disciplinary, cultural, leading to efficient citizenship?

A city like New Orleans exhibits diverse occupations rather than a few specialized activities as in some of the factory-cities of our country. One thinks at once of the building trades, of plumbing, carpentering, bricklaying, of the machinist, the engineer, the draughtsman, the printer, when the usual work of a boys' trades school is considered. To make boys and men more successful in all of the occupations usually followed in a given city is a difficult if not impossible task. For example, more than 140 occupations are represented by the boys and men in the night schools of New Orleans.

Part One, referred to above, represents only the results of the preliminary study of some local school conditions. Since this study is now available to the reader, it will suffice here merely to indicate the table of contents. A chapter of this bulletin is occupied by our local study of thirteen-year-old boys, the data from which afford contrasts with data obtained by Ayres from some 68 other and smaller cities. We have done this work separately for the white and colored boys.

[CONTENTS OF PART ONE, VOCATIONAL SURVEY.]

Letters of Transmissal.

Pages 1-5

Tables and Charts.

I. *Introductory Considerations.* Pages 8-9
The Gift of Isaac Delgado.
Reasons for This Study Preliminary to Establishment.
Action of the Commission Council of New Orleans.
What Is a Trades School? Terminology.
Scope of This Study.

Pages 10-15

II. *General Facts About Public Schools in New Orleans.*
Opportunity Lacking for Education of Youth in Trades.
Successes and Failures of Schools and of Homes.
The Number of Boys Enrolled in the Fifth, Sixth, Seventh and Eighth Grades Is Relatively Too Small in New Orleans.
Analysis of Progress of All of the Children in Each Grade of Every Public Elementary School in New Orleans.

Pages 16-26

III. *Elimination of Pupils from the Schools.*
Boys Drop Out of School Early.
Why Boys and Girls Drop Out of School.
A Study of the Causes of Withdrawals from the Paulding and from the St. Philip Schools.
The Eliminated Are Untrained Workers.

Pages 27-32

IV. *A Study of Our Thiteen-Year-Old Boys.*
Significance of This Age-Period.
Thirteen-Year-Old Truants Are Retarded in School Work.
The Thirteen-Year-Old Delinquent Boy.
Further Evidence of Maladjustment of Thirteen-Year-Old Boys to School Grades.
One Significant, Simple Index of Efficiency.
Comparison With Other Cities.
Schools in a System Differ.
Nativity and Industrial Conditions.
Occupational Distribution of Fathers of Thirteen-Year-Old Boys.
Teachers' Impressions of Boys' Aptitude for Trade Work.

Pages 33-42

V. *Attitude of Employers of New Orleans Towards Evening, Part-Time, Preparatory and Practical Trade Schools.*
Their Interest Promises Co-operation.

Pages 42-43

VI. *Night-School Students in Relation to Trade Education in New Orleans.*
The Laborer-Student.
Facts About 1472 Wage-Earners Who Go to Night Schools.
Age Distribution.
Temporary and Blind-Alley Jobs.
Present Daily Occupations of Boys and Men in the Night Schools.
Stated Ambitions or Desired Occupation of Boys and Men in the Night Schools.

Pages 43-52

VII. *Education Is for the Masses.*

Pages 53-56

VIII. *Forthcoming Delgado Studies.*

Page 57

II. Statistical Analyses of Groups.

One interesting feature of our statistical analyses, which will be explained in detail in the forthcoming report of Superintendent Gwinn, is the intensive analysis for each grade of each school in the city, an analysis made practical, we believe, for use by superintendents, principals and teachers. The percentages, first for each of the eight grades of the city considered as a whole, and then, separately for the different schools, for the sake of comparison, have been computed. In every case the average deviations are computed, so that on the basis of local experience something like an objective standard has been erected for each grade in regard to these several conditions. The results have been prepared on specially devised blank forms, which have been distributed to the principals. These summaries later were made the texts for conferences between each principal and Superintendent Gwinn and Assistant Superintendents Bauer and Habans, looking to the betterment of conditions. A reproduction of one of these blanks is the briefest method of illustrating the system. (See Table I.)

Related to this work, an experiment has been made in the intensive study of elimination of pupils. By means of personal visits made to the homes of each child who withdrew from school during the preceding term, light has been thrown upon the economic and social factors active in elimination. The labor involved was entirely that of Miss Mary Railey, an efficient student of sociology. Her results were obtained for only three selected schools, but they demonstrate the practical value of this kind of investigation. If we are to rectify the expensive evil of elimination, it is worth while first to know the true conditions and the dominant factors in each school.

III. Individual Studies of Exceptional Children.

There is a marked lack of adequate administrative provisions for the care of exceptional school children in New Orleans. We use the term "exceptional" child in the sense of any child who presents extreme individual variations—mentally, morally or physically, from most children of his age. This definition helps us before the public in emphasizing

Department of Educational Research, Public Schools, New Orleans. FORM K.

TABLE I.

GROUP ANALYSIS: PROGRESS, REPEATING, ENROLLMENT, BEGINNERS.

Crossman School. First Term, 1913-1914.

Number in each group / Grade enrollment = Per cent.

ELEMENTARY SCHOOL GRADES AND CITY AVERAGES.

		I				II				III				IV				V				VI				VII				VIII			
		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.		Percentages this school.	City averages, percentages.	A. D. for City.	
AT AGE usual or rapid progress	B	63	58	12	..	62	42	12	..	35	35	8	..	34	28	10	..	24	27	10	..	32	35	13	..	24	39	11	..	14	50	13	..
	G	73	67	13	..	70	54	14	..	56	42	13	..	51	31	12	..	28	29	11	..	26	39	12	..	28	43	11	..	23	44	11	..
AT AGE slow progress	B	17	19	7	..	11	18	7	..	26	14	6	..	9	14	5	..	14	15	7	..	19	14	6	..	12	13	7	..	14	9	4	..
	G	10	17	8	..	19	18	7	..	16	17	7	..	12	19	10	..	30	16	6	..	21	13	6	..	11	12	5	..	6	10	6	..
OVER AGE late entrance, lost time	B	8	9	5	..	7	11	6	..	..	11	6	..	11	12	7	..	14	13	9	..	2	18	10	..	21	18	9	..	18	18	8	..
	G	8	8	4	..	5	10	5	..	9	12	6	..	13	15	9	..	15	13	10	..	8	19	10	..	17	16	6	..	32	22	9	..
OVER AGE slow progress	B	13	14	6	..	20	30	13	..	39	40	14	..	45	45	14	..	47	44	12	..	47	34	9	..	42	30	11	..	55	24	10	..
	G	8	9	4	..	5	18	7	..	20	29	11	..	24	35	11	..	27	41	14	..	45	30	11	..	45	30	12	..	39	23	9	..
REPEATING work of last term	B	14	20	9	..	0	17	8	..	14	17	9	..	7	17	9	..	9	14	8	..	4	7	4	..	3	2	2	..	0	4	1	..
	G	10	19	9	..	9	13	6	..	..	12	7	..	6	17	10	..	3	11	7	..	1	9	6	..	0	4	2	..	0	2	1	..
ACCUMULATED repeating	B	30	33	12	..	31	48	15	..	65	54	13	..	54	59	13	..	62	59	12	..	66	48	12	..	54	43	15	..	69	33	13	..
	G	18	26	13	..	24	36	12	..	36	46	14	..	35	54	14	..	57	57	15	..	66	43	15	..	56	42	13	..	45	33	11	..
ENROLLMENT	B	..	..	..	64	..	..	..	45	..	..	..	57	..	..	..	44	..	..	..	76	..	..	..	47	..	..	33	..	..	..	..	22
	G	..	..	..	60	..	..	..	57	..	..	..	45	..	..	..	51	..	..	..	71	..	..	..	77	..	..	47	..	..	..	..	31
BEGINNERS	B	69	50	..	..	2	..	..	..	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	G	75	51	..	..	0	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

NOTE—*Slow progress* may be due to: (1) factors in the *home* and other environment; (2) factors in the *school*, as course of study, teachers, buildings, playmates, etc.; (3) physical or mental factors in the *child*.

the necessity of special attention to the feeble-minded, or to the unusually able, or the habitually vicious, or the child suffering from serious physical defect or disease. In gradually evolving measures for suitable care of these children, we are aiming also to educate sentiment in teachers and parents, and to collect scientific data upon cases brought to our notice. The data-getting has been profitable for our instruction, and the co-operative method employed has brought gratifying results to some parents, teachers and individual children.

The co-operative method for the clinical study of children was begun in New Orleans during 1912 when the writer was organizing and equipping the F. Walter Callender Laboratory of Psychology and Education within the Newcomb College, which is the women's department of Tulane University. The results and methods of this first psychological clinic in the South have been fully recorded in a recent report.[1] When the writer became Director of the new Division of Educational Research supported by the City of New Orleans, the entire work of this psychological clinic, as it affected the Public Schools. was undertaken by the Division of Educational Research. I call this effort a "co-operative method" because for two years a very practical co-operation has been effected in behalf of each child studied, a co-operation between medical inspector, special physicians, social investigator, superintendent, principal, teacher and psychologist. Freely given to this work have been the services of Dr. Edmund Moss, Dr. M. Feingold, Dr. O. Joachim, Dr. E. M. Hummel, Dr. Roy VanWart, Dr. W. W. Butterworth and Dr. D. P. West, and other high-class medical men.

The procedure followed in our psychological clinic is to obtain, *in writing,* all available information from the different angles. The data—from psychologist, physicians (including laboratory tests of blood and excreta), social investigator and teacher—are summarized into a usable form, ending in educational recommendations and suggestions. Finally, a conference is held at which are present parent, teacher, principal, superintendent, medical inspector and psychologist. Misses

---

[1]Extreme Individual Differences in Children of the Public Schools, New Orleans. 1913. 92 pp..

Griffith, Young, Abrams and Pagaud, teachers of New Orleans, all of whom were former students of the writer, have acted in relays as volunteer assistants during the psychological examinations. A complete series of blank forms necessary to the various steps, from obtaining the written request of parents to the laboratory and social investigations, has been devised, and during two years it has been found practicable. During the past year more than twice as many children have been studied individually as during the preceding year—altogether about one hundred, not including another group of school children who for purposes of research were put through a series of psychological tests—the Binet, the form-board, the Woodworth-Wells color-discrimination, Ebbinghaus completion, etc. All of this is evidence of the increasing appreciation of organized provision for subjecting exceptional children to scientific but sympathetic study, with a view to ascertaining ability and educational capacity and also any remedial defect. The large amount of work was accomplished often by disregard of any time-table of labor upon the part of the writer and his assistants, and because of the liberal support of the physicians. During the coming year it will probably be impossible to maintain the pressure entailed by these individual studies without readjustment of the tasks of the Division or the employment of extra assistance.

Space is not available here for the printing of any of these summaries or individual studies, which average from 1200 to 1500 words. Each is intended to be a systematic inventory of the child from the various viewpoints of the different workers interested.

As a part of this phase of our work a special study was made during March, April and May of a group of 63 delinquent and neglected boys confined in an institution known as the Harbor and Reform School for Boys. Most of these boys have passed through the Juvenile Court. The new Commission Council of the city is now confronted by the necessity of making adequate provision for delinquent and neglected children. In an emergency Mayor Behrmann, Commissioner Lafaye and Superintendent Gwinn asked the writer to make a special study for the information of the authorities of the

city. The investigation was completed in June, and comprised: (1) A rapid visitation by the writer to certain juvenile courts, detention homes, parental schools, orphanages, industrial farms, juvenile reformatories and jails in Louisiana, Missouri, Illinois, Ohio, Pennsylvania, New York and Massachusetts. A description, with pictures of typical institutions, was made a section of the report to the Council; (2) Each of the 63 boys was subjected by the writer to psychological tests and to medical and sociological study. Dr. Edmund Moss, Director of the Division of Hygiene, at the request of the writer, secured the assistance of a special corps of physicians who made the series of medical examinations. An outline of the special procedure followed in the case of each boy of this delinquent group will suffice to illustrate even more clearly our work of the psychological clinic, whether for imprisoned delinquents or exceptional children from the schools.

OUTLINE OF PROCEDURE IN STUDY OF A GROUP OF DELINQUENTS.

(1) *Psychological Tests by the Director.*
Subject's recital of own history.
Form-board.
Binet-Simon.
Woodworth-Wells Color-naming.
Aussage, Healy, etc.

(2) *Anthropometric Measurements, by the Director and Physicians.*
Height, Weight, Chest, Grip, Head-Circumference, Cephalic Index.

(3) *Medical Examinations.*
Laboratory, Dr. Wymer.
Internalist, Dr. Moss.
Orthopedist, Dr. McIlhenny.
Oculist, Dr. Smith.
Aurist, Dr. Martin.
Orthodontist, Dr. Gorman.
Neurologist, Dr. Daspit.

(4) *Social Investigation; Miss Mary Railey.*
Court Record.
Home or Personal History.

(5) *Teachers' Impressions.*

In addition to the tables derived from the tests, the report contains for each boy the usual individual summary—the chapter comprising some 227 typewritten pages. This inventory was intended for use in future educational treatment of the boys. It is interesting to observe that since this rapid study was completed, the writer has had requests from representatives of one or two orphanages to make similar inventories.

With regard to the psychological tests considered as clinical devices we may record here these general observations: We regard any "team of tests" only as convenient material for routine use in securing reactions to be observed. In all but the *Aussage,* we have taken the precaution to subject control groups to the tests used. At best we have not been able to place great confidence in numerical expression of ability, in quantification of data. Of course, quantified results are better than judgments based upon casual observation which is the other alternative. We have steadily resisted attempts of "Binet testers" to make even "preliminary diagnoses" in our schools. We believe that the actual collection of adequate data, especially from co-operating physicians, social worker and psychologist, is the only safe procedure in attempting to study for practical purposes an exceptional child. If the psychological clinic in America departs far from this commonsense procedure, it will lose scientific integrity and fall deeply into merited disrepute. The struggle of the writer to maintain this principle has at times been costly, but the position now after two years of trial seems justified.

We venture to believe that our modest organization for educational research in New Orleans during 1912-1913 and 1913-1914 will become more than locally interesting, since the results to date are a demonstration of the practicability and usefulness of a division of educational research for the public school system of an American city, and indicate especially that a co-operative spirit can be utilized and sustained in the face of difficulties.

A MODIFIED SLIDE RULE AND THE INDEX METHOD IN INDIVIDUAL MEASUREMENTS.

A. P. WEISS,

Ohio State University.

CONTENTS.

I. Introduction.
II. Description of the Slide Rule.
III. The Index Method.
IV. Application of the Method Where a Norm is Available.
V. Classification of the Various Indices.
VI. Application of the Method Where no Norm is Available.
VII. Application of the Method to Examinations and Routine Grading.
VIII. Application of the Method Where Tests are to be Compared With Each Other.

I. INTRODUCTION.

In a recent book by Dr. Wm. H. Pyle[1] a need is expressed for a more uniform method of reporting the standing of pupils in their class work, and also in such physical and mental tests as are to be used in determining promotions, transfers to special institutions or in reports submitted to the parents. There are no numerical units for measuring mental traits which are clearly enough defined to be generally acceptable, and the qualitative measures of Excellent, Superior, Medium, Inferior, or the letters A, B, C, D, E are too variable for the different markers to admit of a quantitative evaluation unless they are defined with reference to some objective standard such as the normal curve.

What is needed is some numerical measure of relative position, on the basis of some norm, where such is available, or where norms are not at hand the relative position should be found in terms of the average accomplishment of the class or group in which the pupil was tested. Measurements of rela-

[1] *The Examination of School Children.* The Macmillan Company, 1913.

tive positions are, unfortunately, not so easily computed as measurements in absolute units, and this is perhaps the reason why this method has been restricted to the use of experts who have an adding machine at their disposal and who are skilled in the use of the slide rule.

The purpose of this paper is to describe a modified form of the 10-inch Mannheim Slide Rule used by engineers, and to suggest how this simplified device may be used in placing the results of physical and mental measurements on a uniform basis, so they can be easily understood by the average parent or school teacher. It is immaterial how complex the original test may have been, or whether the units in which the tests are made are in centimeters, seconds, ideas, kilograms or any other unit. With this simplified slide rule they may be quickly reduced to a uniform basis with no more arithmetical skill than is at the disposal of every school teacher.

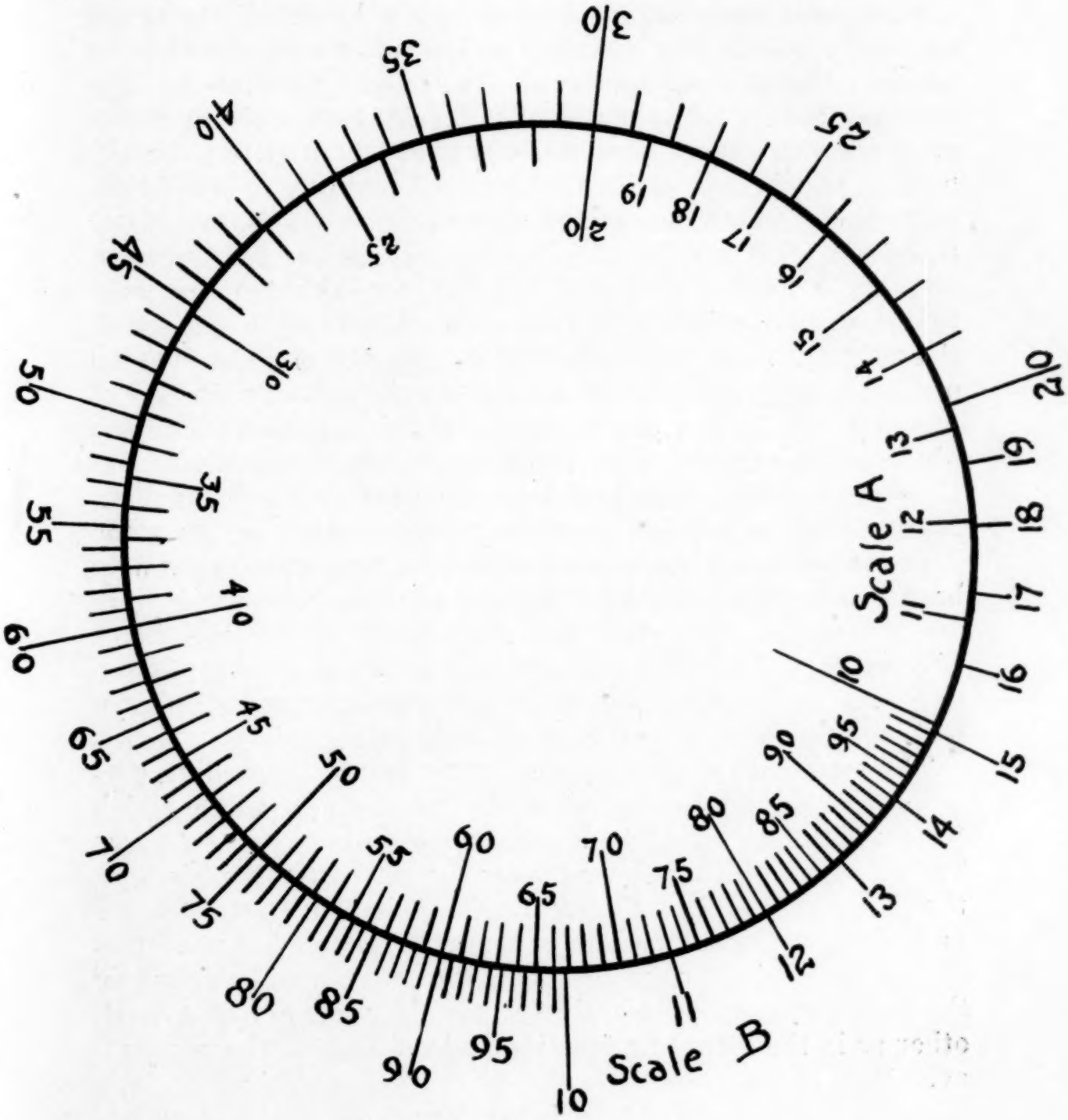
The learning to read and set the slide rule for any given set of measurements can be mastered in a few minutes, and, with practice, skill and facility are acquired which will lead to an extension of the usefulness of this simplified rule.

II. Description of the Slide Rule.

The slide rule is shown in Figure 1, and consists of two identical circular scales which in the rule itself can be shifted over each other. In the illustration the line along which the shifting is done and upon which the readings are made is indicated by the black circle. In this article the inner scale will always be referred to as scale A or simply "A." The outer scale will always be called scale B or simply "B." Thus 75A refers to the number 75 on the A or inner scale, while 50B refers to the number 50 on the outer or B scale.[2]

These scales are logarithmic, and possess the property that if they are shifted so that 50A stands over 75B, all the other numbers on the scales will be in the same proportion, 50:75 or 2:3. That is, any number on B will have above it on A a number which is two-thirds of itself. The two scales in Figure 1 are set in this proportion, and it will be seen that above 21B will be found 14; above 30B we find 20; above 67.5B is

[2]The C. H. Stoelting Company, 121 N. Green street, Chicago, Ill., has agreed to furnish this simplified rule.


Scale A
Scale B

45, etc. The numbers on scale A are always the numbers on B multiplied by two-thirds. If, now, scale A could be shifted to any position over scale B, it would be possible to get any proportion, and again all numbers on both scales would be in the new proportion. The numbers on the rule shown are from 10 to 100. Not all the numbers are indicated by numerals. The numbers 21, 22, 23, etc., are only indicated by division marks on the scale. The use of the rule is not limited to the numbers in which it is divided. Thus the number 20 stands for any number which can be made by adding zeros before or after it, as 200, 2000, 2.0, .20, .02, etc. In the same way the number 15 may be taken at 150, 1500, 1.5, .15, etc. This is rather confusing to the beginner, but the instructions which come with the rule will make this clear. The steps between the division marks on the scale must be estimated. As a rule, estimates of one-fifth, or .2, are easily made by the beginner. For the physical and mental tests fractions can be disregarded, and it is only necessary to read to the nearest whole number. Many norms will fall between the numbers given on the scale. This cannot be avoided, because the numbers on the rule have been so selected that they will apply to those norms which are most frequent. For example: The norm for the weight of 12-year boys, 34.15 kilograms, cannot be found exactly; 34 can be found, and also 35, but the .15 must be estimated. This defect is an inherent property of all slide rules.

The modified rule is also admirably suited for finding percentages. Suppose it is desired to find the percentage which 34 is of 51. All that it is necessary to do is to set 34A over 51B and read off the per cent. over the end of the B scale, *i. e.*, the line marked 10 in Figure 1. On A in the illustration we find 66 +, or , since the line is nearer 67 than 66, we call this 67 per cent. Any other per cent. can, of course, be found in the same manner by merely setting the numbers over each other as in the form of a fraction and reading off the per cent. over 10B.

III. The Index Method.

The method itself belongs to the mathematical measuring methods included under the category "Measurement by Relative Position." It has been called the Index Method because

its units are never absolute units. It gives only the relative position of the individual, which position is based on the average accomplishment of the group with which he belongs, or, if norms are available, his position is based upon his deviation from the norm of the group. Because of this the method yields a personal *index*. It is not itself a record of actual accomplishment, though, of course, the actual accomplishment of the individual can always be again secured by reversing the method.

Algebraically, the method can be expressed by the following formula: $I = \frac{50\,u}{m}$ Where I is the index to be found u = the actual accomplishment or units of the individual; m = the average of the class, or the median, or the norm.

The slide rule is introduced for the purpose of eliminating the multiplication and division which is implied in the use of this formula.

Illustration: Suppose a 10-year boy scores 8 correct associates in the Part-Wholes test. The norm for 10-year boys is 7 correct associates. Substituting these values in the formula, we have $u = 8$, $m = 7$. $I = \frac{50x8}{7} = 57$. Thus the index, or $I = 57$.

With the slide rule the multiplication and division is eliminated. The numbers 7 and 8 are not given in the scale, but 70 and 80 are given. By shifting the decimal point 70 becomes 7.0 and 80 becomes 8.0. If now we set 50A over 70B we will find the index 57 over 80B. No calculating is necessary. The rule is set and the index is read off.

Further applications of the method will be made as the various practical applications of the index are considered. For some, no doubt this treatment will seem elementary, not to say redundant, but when a presentation of a formula is made to a non-mathematically-trained reader, it is safest not to take too much for granted.

The question will probably arise in the minds of many, "Why was 50 used to represent the Normal?" Why not use 10 or 100 or 500? The writer has tried 1, 50, 100, 500, 1000, and of these 50 was finally selected as the more desirable. Some of the reasons for using 50 are the following:

1. Practically all indices will be in two digits.
2. Decimal places may be disregarded.
3. The slide rule readings are simpler.
4. In correlation work the squares of the deviations are soon learned by heart, and this saves much time.
5. Much of the grading and scoring which is done uses 100 to express "perfect," and it then seems "natural" to express average accomplishment by 50.

The writer originally used 100 as the constant, but later 50 was used with what seemed to him more satisfactory results. Mathematically, perhaps 1 would be the more desirable, but since it is only a matter of expediency, the writer thinks it best to leave this point open. In this article 50 will be used throughout, though it is to be understood that any other number might be used.

IV. Application of the Method to Individual Measurements Where a Norm Is Available.

Suppose we have a 12-year boy whose physical and mental measurements in 10 tests are as follows:

TABLE I.

I.	II.	III. Index.
Height	136.0 centimeters	49
Weight	36.2 kilograms	53
Cephalic index	80.4	51
Visual acuity	1.3	65
Vital capacity	1895.0 cubic centimeters	50
Part-wholes test	8.5 words correct	54
Auditory memory	58.3 per cent. remembered	52
Binet-Simon rating	12.4 years	52
Logical memory	35.2 ideas reproduced	50
Word-building test	11.5 words formed	52
Average in all tests		53

Columns I and II give the tests and the actual measurements in centimeters, kilograms, per cent., words correct, ideas reproduced, etc. It is difficult for even an expert to determine by a mere inspection of these columns whether this particular boy is above or below the normal of 12-year boys. How much above or below the normal is still more difficult to determine. To the average teacher or parent the figures are only confusing. Such lists as these are responsible for the discourag-

ing attitude taken against the methods of educational psychology by many school authorities, an attitude which often leads to the remark, "This testing business is all nonsense."

Evidently, if the centimeters, grams, per cents., ideas reproduced, words formed, etc., could all be transformed into some common unit based upon the average or norm, these figures would immediately indicate whether the boy is above or below the normal in any of the tests, and the extent of the deviation from the normal would also be shown.

In column III of the table the figures under column II have been reduced to a uniform basis by the index method, by setting the norm for each test equal to 50. This column will now by mere inspection tell just where the boy stands in each test, and each test can be directly compared with any of the others. The description of the boy's record is also much simplified. His index for height is 49, one point below the normal; his index for vital capacity is 50, exactly normal; his index in the Part-Wholes Test is 54, four points above normal, and so on for the other tests. The average of the 10 tests is 52.8, or about 53, showing that on the whole this particular boy is slightly above the normal. The number secured by getting the average of all the tests may be termed the *average index,* in this case 53. It can, of course, be readily seen that the reliability of the average index will depend on the number of tests, and this should act as an incentive for increasing the number of tests. When no attempt is made to reduce the tests to a uniform basis, the adding of tests only leads to greater confusion. By the use of the index method, however, supplementary tests are just as easily interpreted as any others.

V. Classification of the Various Indices.

Where tests in sufficient numbers are given it is better to divide them into different groups.

Group I. *Physical Index.*

In this group all the physical measurements, such as height, weight, strength of grip, vital capacity and the several anthropometric measurements, could be grouped together, the average index calculated and given the name of *physical index.*

Group II. *Sensori-motor Index.*

In this group might be included the various tests of sensory acuity and motor skill: Visual acuity, auditory acuity, tactual discrimination, weight discrimination, tapping rate, steadiness test, mirror writing, etc. The average of the various indices of these tests might be called the *sensori-motor index.*

Group III. *Mental Index.*

This group might be formed by treating together all those tests which go by the name of mental tests, such as the General Information Test, Part-Wholes Test, Genus-Species Test, Auditory Memory for Digits, Memory Span, Logical Memory, Controlled Association and all indices of the examinations in the various school subjects. The method of handling examination and classroom results will be treated in Section VII. The average of the various indices of this nature could be termed the *mental index.*

This form of grouping is to be considered suggestive rather than as a well-thought-out plan. There are many tests which might well be included in two of these groups. The writer had in mind, while developing this classification, the relatively well-defined differences between physical, physiological and mental measurements. In the writer's opinion, the status of individual measurements is still too indefinite to admit of any but a provisional classification. However, often a poor classification is better than none at all.

To bring the index method into still greater relief with the ordinary method of recording the actual units of the tests, Tables II and III have been prepared.

In Table II the hypothetical measurements of six boys ranging from 9 to 14 years are given. The tests are taken from Whipple's *Manual of Mental and Physical Tests* and Pyle's *The Examination of School Children.* The figures and names in parentheses following the names of the tests indicate the book and page on which the norms are given.

In Table II the actual units in which these tests are made are given, while in Table III these units have been reduced to

TABLE II.

Pupils	A	B	C	D	E	F
Age	9	10	11	12	13	14
Height (Whipple, 53), cm.	125	127	140	136	147.6	151.9
Weight (Whipple, 58), kg.	24.3	30.2	30.0	36.2	39.0	45.8
Vital capacity (Pyle, 50), c. c.	1350	1450	1690	1890	2350	2760
Visual acuity (Snellen)	.8	1.2	.9	1.3	1.0	1.3
Pain limen (Whipple, 204), kg.	2.0	2.0	2.1	1.95	1.9	1.5
Tapping rate (Pyle, 51)	13.2	14.6	17.9	21.2	28.6	35.3
Logical memory (Pyle, 10), ideas	24.3	26.5	32.9	35.2	37.8	40.5
Word building (Pyle, 23), words	5.4	8.3	10.8	11.5	13.6	15.9
Part-wholes (Whipple, 321), correct	7.0	6.0	7.0	8.5	9.2	9.3
Binet-Simon rating, years	8.5	9.5	11.0	12.4	14.5	17.0

TABLE III.

Pupils	A	B	C	D	E	F
Age	9	10	11	12	13	14
Height	50	49	51	49	50	50
Weight	46	54	48	53	51	54
Vital capacity	46	45	49	50	56	57
Physical index	47	49	49	51	52	54
Visual acuity	40	60	45	65	50	65
Pain limen	42	42	49	51	53	71
Tapping rate	46	44	47	50	58	62
Sensori-motor index	43	49	47	55	52	66
Logical memory	42	44	50	50	52	56
Word building	37	44	49	52	56	67
Part-wholes test	45	39	40	54	51	52
Binet-Simon rating	47	47	50	52	54	61
Mental index	43	44	47	52	54	59

a uniform basis by the index method. The tests have been grouped as suggested in the preceding paragraphs into physical, sensori-motor and mental indices. A mere inspection of these indices will immediately reveal the standing of any of the pupils. Multiplying the number of tests or pupils does not lead to greater confusion, but adds much to the reliability of the data. Table II is unintelligible to the average teacher, and perhaps just a bit puzzling to the educational expert, whereas Table III can be used to show just where each pupil stands in each test and in all the tests. No special training is necessary to make the interpretations, and with a little practice the average teacher "can get something out of such a report."

There are, of course, many tests for which no norms are available. This does not restrict the usefulness of the method, since the average accomplishment of the class or group can be set equal to 50 and the index found in the same way as when a norm is given.

VI. Application of the Method Where a Norm Is Not Available.

Suppose, in a series of tests, it is desirable to include a test for which no norm is at hand, as, for instance, a test in mirror writing. Suppose the Norsworthy Part-Wholes results are to be compared with the results of a test in mirror writing, both tests to be given to a class of 12-year boys. The hypothetical results of a class of six are shown in the following table.

	Pupils	A	B	C	D	E	F
1	Part-wholes (correct words)	7.3	7.5	7.8	8.5	8.8	9.0
2	Mirror writing (seconds)	42	55	50	60	40	23
3	Part-wholes, norm 8.5, index	43	44	46	50	52	53
4	Mirror writing, index. Average of class, 45 seconds.	54	41	45	38	56	98
5	Average index, both tests	49	43	46	44	54	75

The norm for the Norsworthy Part-Wholes Test for 12-year boys is found on page 321 of Whipple's *Manual*. This norm is 8.5, and represents the number of associates correctly given. There is no recorded norm for mirror writing, but the average of the class, which is found to be 45 seconds, is used instead of the norm. The indices for each test for each pupil as well as the average index in both tests are shown in the table. The mirror writing test has been used because it shows an inverse relation. The *less* the time required to perform the test, the *greater* the skill. This means that where the number of the seconds is low, the index should be high. With the modified slide rule inverse relations cause no difficulty. It is only necessary to turn the A scale over, and the same method as that used with the direct relations can be used.

Anyone who has ever tried to interpret a group of tests in which a few were in inverse relation knows how exasperatingly often this inverse relation is forgotten; and even if it is not forgotten, how confusing it may become. In lines 1 and 2 of the table the inverse relation is present. In line 1 the highest

accomplishment is expressed by the highest number; in line 2 the highest accomplishment is expressed by the lowest number. In lines 3 and 4, where the index method is used, the highest accomplishment is expressed by the highest number in *both* tests. Line 5 is the average index for both tests, and it can be secured from lines 3 and 4 as they stand. To get the average of lines 1 and 2 would have no significance, because the units are different and the magnitudes of the numbers are different.

The foregoing illustration is not unusual. Often in classes in Advanced Educational Psychology where the students are learning to give the various tests, and where each student is held responsible for some particular set of tests, it is difficult for the instructor to show the value or justification of the tests. If the students are required to record their results by the index method, each student's work can be compared directly with the work of every other student.

VI. Application of the Method to Examinations and Routine Grading.

Where the per cent. method is used in grading examination papers, many difficulties are encountered. The grade 65 for one instructor may represent a higher degree of accomplishment than the grade of 75 given by another instructor. On the other hand, a grade of 65 in one examination may represent the same degree of ability as the grade 75 in a less difficult examination. These two factors: (1) the personal equation of the instructor, and (2) the variations in the difficulty of the examinations tend toward unreliability with the per cent. method. The index method practically eliminates these variables, and the writer has thought it worth while to illustrate its use in grading papers.

The following table shows the result of an examination given to six pupils.

Pupils.	Exam. marks.	Index.
A	55	37
B	62	41
C	70	47
D	80	53
E	85	56
F	98	65
Average	75	

How the examination marks are secured is immaterial. The instructor may allow 10 for each question, or he may assign some numerical value which in his judgment measures the excellence of the answer. No attempt need be made to keep the values within a definite limit. After all the papers have been graded and the values for each student have been found in the ordinary manner of adding together the values for each question, the index method requires further that the average or median of the class be found. In the illustration given this average is found to be 75.

Where the class is large, it is not necessary to find the average. If the papers are arranged in the order of their excellence, the grade of the paper half-way between the best and the poorest paper may be used in place of the average. This is the median value, and when the actual average is not easily obtained, the median is just as acceptable, and in general is to be preferred. After the average or median of the class has been found, this number is set equal to 50 on the slide rule. The illustration in Fig. 1 is set for the result given in the table. 50A is set over the average of the class, 75B. All the examination marks can now be reduced to the index by hunting the marks on scale B and reading the corresponding index values off of scale A. Thus the mark of pupil A is 55, and above 55B we find 36 +, or 37, which is the index. The other indices are found in the same way by reading off the corresponding values on A without any shifting of the scale or calculating.

The index method reduces all examinations or written exercises to the same basis, no matter what the class averages for the different exercises may be. The student can be constantly aware of his position in the class and the kind of work he is doing. The subject of grading is receiving so much attention at the present time that the writer will content himself with tabulating some of the advantages of the index method.

1. Every examination is directly comparable with every other.

2. The personal equation of the teacher is practically eliminated, because the index of the student is based upon what

the class as a whole actually accomplish, and not upon what the instructor thinks they should accomplish.

3. The index is practically the same, whether the examination is easy or difficult, short or long.

4. Criticisms against the integrity of the instructor are largely disarmed. When a student once learns that his index is based upon the average of the class, he cannot ascribe his inability to make satisfactory grades to the excessive requirements of the instructor.

5. The instructor is guided in his teaching. If the class average is low, this means he is going too fast for the degree of preparation which his students possess. If the class average is high, this means he is going too slow.

In the writer's own practice he tries to teach at such a rate that the average accomplishment of the class is about two-thirds of what he considers a perfect paper.

The writer does not claim for the index method that it is an objective form of grading. It measures only relative position, beginning with the most constant value which can be found, namely, the average of the class.

VIII. Application of the Method When Tests Are to Be Compared with Each Other.

The index method is also of value when it is desirable to compare two tests as to their relative efficiency. In an article by Dr. Rudolf Pintner, "*A Comparison of the Ayres and Thorndike Handwriting Scales,*" which appears in this issue, the judgments of the samples of handwriting for both scales were reduced to a basis of 50 by the index method. It would, of course, have been perfectly legitimate to have converted the units of one scale into those of the other, yet when the index method is used fractions may be disregarded, and the values secured are almost invariably two digits. Besides, using the same basis for individual measurements wherever possible brings about a certain facility and skill in the handling of the results, and especially in their interpretation, which cannot be attained when now one and now another unit is used. Where derived values are to be found, as average or standard deviations, correlations, probable errors, etc., the index

method quickly brings about a kind of standardization of procedure which is exceedingly helpful and as unfatiguing as the nature of such work permits.

At the rate at which the different tests, scales, "mental measuring rods," etc., are accumulating, more and more effort must be expended in "testing the tests." The nature of the tests will determine how the testing is to be done, but much greater uniformity and ease in reading could be secured if the arithmetical procedure could be simplified and standardized. No one now doubts the value of the Pearson correlation formula and how much it has aided in making educational psychology quantitative. Is it not time for educational psychology to go a step farther and investigate what number series are best suited to its purposes? Can all individual measurements be adequately expressed by the numbers between 0 and 100, or do we need only the steps 0 to 10, or 0 to 1000?

Uniformity is just as possible in mental measurements as in physical measurements. The limits cannot perhaps be so closely approached, but at present we have only the vaguest conceptions of what these limits are. If the index method as outlined in this article has contributed only a little toward calling attention to a need of greater uniformity in the technique of handling individual data, it will not have been written in vain.

A COMPARISON OF THE AYRES AND THORNDIKE HANDWRITING SCALES.

RUDOLF PINTNER,

Ohio State University.

I. Introduction. The purpose of this paper is to estimate the relative accuracy of judgments of handwriting when graded by the Ayres and Thorndike scales, respectively. Now that there are two handwriting scales, the question naturally arises as to which of the two is more useful in the ordinary routine work of grading samples of handwriting. The more the knowledge of educational psychology permeates our school work, and the more our teachers realize the necessity for objective standards of measurement, the more widespread will become the use of all these objective measuring rods, such as handwriting, composition and spelling scales. And the use of such objective scales will stimulate the production of still more. It seems well to the writer, however, that we should be continually testing the scales themselves, so that ultimately the fittest may survive.

What do we mean by the fittest in respect to any such scale? Obviously, the one that will accomplish best the purpose for which it has been designed, and this purpose in the present case I take to be the ease and accuracy with which the scale can be used by the majority of intelligent observers. A scale must be adapted to the use of many observers. That it can be applied with great accuracy by this or that particular individual is no test of its reliability. It must give fairly accurate results with any intelligent individual, and that scale will be the most reliable that shows the least deviation in the judgments of many different individuals. This is obviously of importance if our handwriting scales are to come into general use in our schools, if our superintendents and principals are to make use of them as objective standards of measurement for the handwriting of whole classes, or schools, or even school systems. Our problem then reduces itself to this: Given

the two scales, the Ayres and the Thorndike, which of the two will show the least amount of deviation in the ratings of the same samples by a number of individuals? Or, in more general terms, Which scale shows the greatest amount of agreement in the rating of handwriting by many different individuals?

The composition of the scale has directly nothing to do with this problem. For the practical application of the scale it is immaterial whether the one has been based upon legibility only and the other upon legibility plus aesthetic factors. Both scales represent grades of goodness or badness in handwriting, and the teacher in comparing a definite sample of handwriting with the steps on the scale merely tries to place her sample next to the step which it appears to resemble most. As a matter of fact, in framing the Ayres scale[1] legibility alone was taken into consideration. No doubt legibility is by far the most important factor in any handwriting. Whether our general judgment of a definite piece of handwriting is or can be based solely upon legibility is a different question. The ultimate test of a scale framed in such a manner will have to rest upon its reliability in actual practice. The Thorndike scale,[2] on the other hand, is based upon other factors besides legibility. The qualities of beauty, character, ease, etc., were also taken into account.

II. Grading the Samples. In the present study twenty-four samples of handwriting were graded on both scales by thirty-three observers. Most of these latter were students of a class in educational psychology; some had had experience in actual teaching, and a few of the observers were teachers in the grades. The writer himself was one of the observers. The two scales had been demonstrated before the class; their nature and composition had been made clear, and their aim had been fully explained. The twenty-four samples used in the experiment were chosen out of about 300 samples written by the children of an ordinary grade school. These were all written under conditions as uniform as possible, *i. e.*,

---

[1] LEONARD P. AYRES. *A Scale for Measuring the Quality of Handwriting of School Children.* No. 113. Russell Sage Foundation.

[2] EDWARD L. THORNDIKE. *Handwriting.* Teachers College, Columbia University, New York, 1912.

the children wrote for five minutes any selection of poetry or prose that they had committed perfectly to memory. Samples were secured from all of the eight grades. Bad, good and indifferent samples, according to the opinion of the writer, were chosen to make up the twenty-four samples used by the thirty-three observers. The observers were told to grade the twenty-four samples on each of the scales—first on one of the scales and then on the other. No comparison was allowed between their grading on the one scale and their grading on the other. They were told not to allow their judgments on the first scale to prejudice their judgments on the second, and, as a matter of fact, I do not believe that judging on one scale first would influence to any great extent, if at all, the judgments on the succeeding scale. The number of samples was too great to allow any memory of the first set of judgments to carry over to the second set. Sometimes the Ayres scale was used first and sometimes the Thorndike. In grading on the Ayres scale the observers were told that they could make use of intermediate steps not marked on the scale. Thus, if they thought a sample was slightly better than 50, but not quite as good as 60, they were told to grade it 55, and so on with all the other intermediate steps.

Unfortunately, no actual count was kept of the preferences of the different observers in regard to the two scales, but the great majority undoubtedly preferred the Ayres. This, I believe, is entirely due to the general make-up of the scale and to the percentage system employed to mark the different steps. The Thorndike scale is unwieldy to handle, the different steps are not clearly enough marked off from each other and the steps are not numbered in the conventional method of percentages so dear to the heart of the teacher.

It will be seen, therefore, that each of the twenty-four samples of handwriting was graded sixty-six times, thirty-three times on the Ayres and thirty-three times on the Thorndike scale, making a total of 1584 judgments. The grades for each sample were added together and an average grade for each sample for the thirty-three observers was obtained. These averages are given below in Table I.

TABLE I.

No. of sample.	Average Judgment. Ayres.	Average Judgment. Thorndike.	Rank. Ayres.	Rank. Thorndike.
12	20.6	5.9	1	1
6	24.2	6.5	2	2
8	28.4	7.3	3	3
21	35.3	8.4	4	7
4	36.2	8.0	5	4
15	36.3	8.3	6	6
1	37.1	8.1	7	5
22	40.3	8.9	8	8
5	40.3	9.0	9	10
17	41.8	8.9	10	9
18	48.9	10.1	11	11
14	49.2	10.2	12	12
9	52.4	10.7	13	14
7	55.7	10.6	14	13
24	55.7	10.8	15	16
11	56.0	10.7	16	15
10	56.9	11.3	17	19
2	57.7	10.9	18	17
13	58.0	11.2	19	18
19	58.9	11.5	20	20
20	64.2	11.8	21	21
23	74.2	13.8	22	22
3	80.1	14.2	23	23
16	82.1	14.8	24	24

$r = .98$.

From this table we note first that the samples were fairly representative of good, medium and bad handwriting. Every step on the Ayres scale from 20 to 80 is represented, and similarly with the Thorndike from 5 to 14, with the exception of 12. Further, the rank of each sample on both scales (columns 4 and 5 in Table I from the lowest to the highest is almost identical. The correlation coefficient of the ranks is, in fact, .98. We may interpret this to mean that the observers' standards of goodness and badness of handwriting have been practically identical in their work with both scales, and also that the steps on both scales correspond, on the whole, very closely with each other.

III. Deviations in Judgment. To calculate the amount of deviation in the judgments of the thirty-three observers, it is obvious that nothing can be done with the actual grades given, because of the difference of the two scales in the methods of denoting the steps. A deviation of two on the Thorndike scale would mean a difference of two whole steps, whereas

this same deviation on the Ayres would only correspond to one-fifth of a step. The method adopted to make the deviations on each scale directly comparable with each other was to reduce the thirty-three individual gradings of each sample to the basis of fifty. The average of the thirty-three judgments of each individual sample was put equal to fifty, and then the thirty-three judgments were raised to this basis. For example, the average judgment of the thirty-three observers of Sample 1 on the Ayres scale was 37.1. This was put equal to 50, and then each individual judgment was raised

TABLE II.

SAMPLE 1.—*Harry L. Age 8. Second Grade.*

	Rating on Scale.		Basis of Fifty.		Deviation.	
Obs.	Ayres.	Thorndike.	Ayres.	Thorndike.	Ayres.	Thorndike.
1	40	8	54.0	49.5	4.0	.5
2	40	8	54.0	49.5	4.0	.5
3	35	8	47.0	49.5	3.0	.5
4	40	9	54.0	55.5	4.0	5.5
5	35	9	47.0	55.5	3.0	5.5
6	30	6	40.5	37.0	9.5	13.0
7	40	8	54.0	49.5	4.0	.5
8	40	7	54.0	43.0	4.0	7.0
9	40	8	54.0	49.5	4.0	.5
10	35	8	47.0	49.5	3.0	.5
11	40	8	54.0	49.5	4.0	.5
12	50	9	67.5	55.5	17.5	5.5
13	50	9	67.5	55.5	17.5	5.5
14	45	9	60.5	55.5	10.5	5.5
15	40	8	54.0	49.5	4.0	.5
16	30	8	40.5	49.5	9.5	.5
17	30	8	40.5	49.5	9.5	.5
18	35	8	47.0	49.5	3.0	.5
19	35	9	47.0	55.5	3.0	5.5
20	30	8	40.5	49.5	9.5	.5
21	40	8	54.0	49.5	4.0	.5
22	20	8	27.0	49.5	23.0	.5
23	50	7	67.5	43.0	17.5	7.0
24	40	9	54.0	55.5	4.0	5.5
25	45	9	60.5	55.5	10.5	5.5
26	30	6	40.5	37.0	9.5	13.0
27	30	9	40.5	55.5	9.5	5.5
28	20	8	27.0	49.5	23.0	.5
29	40	8	54.0	49.5	4.0	.5
30	30	9	40.5	55.5	9.5	5.5
31	30	7	40.5	43.0	9.5	7.0
32	40	9	54.0	55.5	4.0	5.5
33	50	9	67.5	55.5	17.5	5.5
Total	1225	269			276.0	121.0
Average	37.1	8.1			8.4	3.7

to this basis. In this case Obs. 1's rating of the sample as 40 was now raised to 54, or 4 above the average; Obs. 6's rating of the sample as 30 now corresponded to 40.5, or 9.5 below the average. Similarly for the Thorndike scale. The average for Sample 1 was 8.1. Putting this equal to 50, we have Obs. 1's rating of 8 equal to 49.5, Obs. 6's rating of 6 equal to 37.0, and so on. The thirty-three individual ratings of Sample 1 with the deviations calculated in this manner are shown in Table II.

This table is merely given as an example, for space obviously forbids printing the corresponding figures for each of the other 23 samples. The amount of calculation appears at first sight enormous, but it is extremely simple if a slide rule is used. The Weiss Modified Mannheim Slide Rule[3] was used in this case. The average is set equal to 50, and the required numbers are then at once read off around the circle.

TABLE III.

No. of sample.	Total Deviation. Basis of Fifty. Ayres.	Thorndike.	Average Deviation. Ayres.	Thorndike.	Ratio. Ayres to Thorndike.
1	276.0	121.0	8.4	3.7	.44
2	229.5	174.0	6.9	5.3	.77
3	120.5	186.5	3.6	5.6	1.47
4	371.5	153.5	11.2	4.6	.41
5	266.0	137.5	8.1	4.2	.52
6	318.0	237.0	9.6	7.2	.75
7	232.0	169.0	7.0	5.1	.73
8	340.5	246.5	10.3	7.5	.73
9	270.0	175.5	8.2	5.3	.65
10	258.0	177.0	7.8	5.4	.69
11	278.0	131.0	8.4	4.0	.48
12	246.5	251.5	7.5	7.6	1.01
13	221.5	196.5	6.7	5.9	.88
14	273.0	227.0	8.3	6.9	.83
15	245.5	152.5	7.4	4.6	.62
16	135.0	138.5	4.1	4.2	1.02
17	309.5	149.0	9.4	4.5	.48
18	263.5	199.5	8.0	6.0	.75
19	258.5	196.0	7.8	5.9	.76
20	205.0	183.0	6.2	5.5	.89
21	313.5	160.5	9.5	4.9	.52
22	351.5	196.0	10.6	5.9	.63
23	224.5	187.5	6.8	5.7	.84
24	238.5	220.0	7.2	6.7	.93
Total			189.0	132.2	
Average			7.9	5.5	

[3] A. P. WEISS. *A Modified Slide Rule and the Index Method in Individual Measurements.* See page 511, this issue.

For each individual rating we then have a deviation from the average for both scales, and these deviations are furthermore directly comparable. A deviation of 5 on the one scale will be directly comparable to a deviation of 5 or 6 on the other. Table III gives the total deviations from 50 obtained by this method for the twenty-four samples, and also the average deviation of the thirty-three individuals for each sample.

From this table we see that on the whole the deviation on the Ayres scale is considerably greater than on the Thorndike scale. The total average deviation for the Ayres is 189, and for the Thorndike only 132.2. Looking at each individual sample we see that only three show an average deviation on the Thorndike greater than the corresponding deviation on the Ayres. These three are Samples 3, 12 and 16, for which the Thorndike deviations are 5.6, or 2 more than on the Ayres; 7.6, or .1 more than on the Ayres, and 4.2, or .1 more than on the Ayres, respectively. The difference of .1 is extremely small, and so we have in reality only the case of Sample 3, where the average deviation on the Thorndike is considerably greater than on the Ayres, namely, 2 points. In all the other cases the deviation on the Ayres is greater than on the Thorndike, and in some cases the difference is considerable. This can be easily seen by inspecting the last column of Table III, where the ratios of the deviations on the Thorndike to those on the Ayres are given. The greatest difference is in Sample 4, which shows a ratio of .41 and a difference in the average deviation of 6.6 points. The averages of these columns of average deviations are, for the Thorndike, 5.5 points, and for the Ayres, 7.9, which shows a difference of 2.4 points in favor of the Thorndike scale—a difference which is by no means small when it is remembered that each of these final averages is based upon 792 judgments.

We may therefore sum up this section of the investigation by saying that with the great majority of the twenty-four samples of handwriting, the Thorndike scale gives the most uniform results, inasmuch as the deviation among different individuals is less than on the Ayres scale. With only three samples was the amount of deviation in favor of the Ayres scale, and in only one case was the amount of any consequence.

IV. Deviations of Observers. We might next raise the question as to whether the same superiority of the Thorndike scale holds good with each particular individual. Are the deviations of each particular individual from the average judgment of all the individuals less for the Thorndike than for the Ayres scale? Of course, we know already that as a whole this is true, but it will be more convincing if we can show that this is a general tendency among all the thirty-three individuals, or at least among most of them.

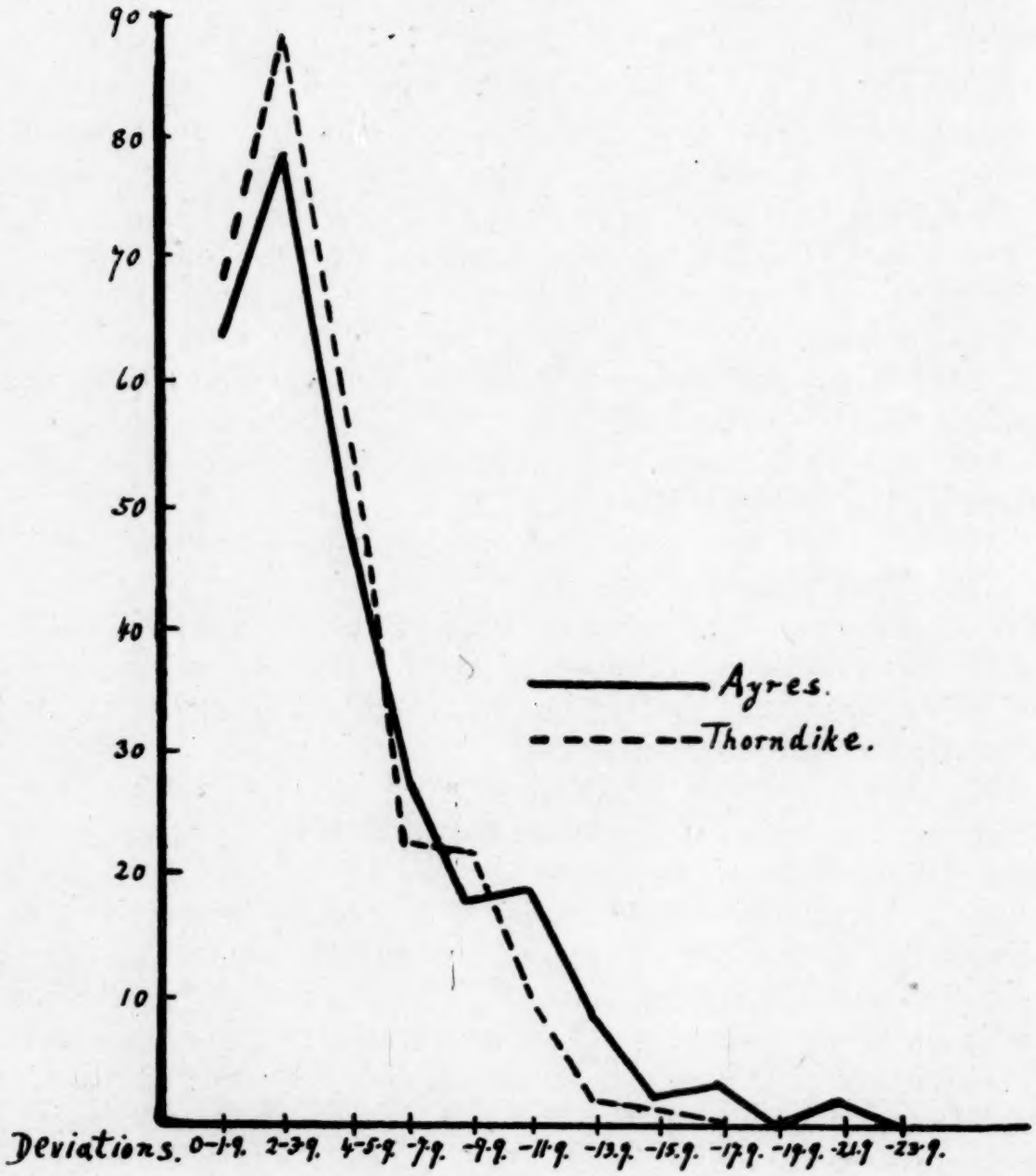
TABLE IV.

Obs.	Total Deviation. for 24 Samples. Ayres.	Thorndike.	Average Deviation. Ayres.	Thorndike.	Ratio. Ayres to Thorndike.
1	177.5	125.5	7.4	5.2	.70
2	230.5	130.0	9.6	5.4	.56
3	176.0	173.0	7.3	7.2	.99
4	151.5	94.0	6.3	3.9	.62
5	147.5	145.5	6.1	6.1	1.00
6	169.0	140.0	7.0	5.8	.83
7	135.5	71.5	5.6	3.0	.54
8	151.5	132.5	6.3	5.5	.87
9	156.5	176.0	6.5	7.3	1.12
10	184.5	113.5	7.7	4.7	.61
11	139.5	104.0	5.8	4.3	.74
12	158.5	121.0	6.6	5.0	.76
13	142.5	130.5	5.9	5.4	.92
14	228.0	105.5	9.5	4.4	.46
15	232.0	189.0	9.7	7.9	.81
16	150.5	100.5	6.2	4.2	.68
17	237.0	120.5	9.9	5.0	.50
18	234.5	145.5	9.7	6.1	.63
19	112.0	103.5	4.6	4.3	.93
20	173.5	81.0	7.2	3.4	.47
21	190.5	124.0	7.9	5.2	.66
22	273.0	180.5	11.4	7.5	.66
23	334.0	120.0	13.9	5.0	.36
24	213.5	123.5	8.9	5.1	.57
25	217.0	157.5	9.0	6.6	.73
26	167.5	162.5	7.0	6.8	.97
27	185.5	112.0	7.7	4.7	.61
28	325.0	138.0	13.5	5.7	.42
29	182.0	173.5	7.6	7.2	.95
30	203.0	218.0	8.5	9.1	1.07
31	168.5	128.0	7.0	5.3	.76
32	205.5	115.5	8.5	4.8	.56
33	169.0	114.5	7.0	4.8	.69
Total	6322.0	4370.0			
Average	191.0	132.0			

Table IV shows the deviations for each of the thirty-three observers. In the second and third columns are given the gross total amounts of deviation from the average judgment for each individual for all the twenty-four samples as placed by that individual on the Ayres and Thorndike scales, respectively. The fourth and fifth columns give the average deviations for each individual. Comparing the figures in these two columns we see that in only two cases is the average deviation on the Thorndike greater than on the Ayres, namely, for Obs. 9 and Obs. 30, where we have a difference in favor of the Ayres of .8 and .6, respectively. In the case of Obs. .5, the deviations are practically equal, being 6.1 on each scale, and if there is any difference, it is in favor of the Thorndike by 2 points in the gross deviation. For all the other thirty observers we have a less amount of deviation on the Thorndike than on the Ayres scale.

We see, then, that this tendency toward greater uniformity on the Thorndike scale is distributed pretty evenly over all the observers. The greater uniformity on the Thorndike scale has not been obtained by some remarkable agreement of a few observers, but rather by a general tendency in that direction by all the observers.

V. Judgments on 273 Samples. A more extensive study than the above was undertaken with 273 samples of handwriting collected from the eight grades of an ordinary grade school. In this case the samples were judged by only two individuals—a teacher of one of the grades of the school in question and the writer himself. The data were handled exactly as in the previous case with the thirty-three observers. The average of the two judgments for each of the 273 samples was taken, was put equal to 50 and the two judgments raised to this basis. In every case the deviations of the two observers were the same—an equal amount above in the one case and below in the other. For example, Obs. 1 graded Sample 21 on the Ayres scale 40, and Obs. 2 graded the same sample 35. The average grade for the two observers was therefore 37.5. Raised to the basis of 50, the grades of Obs. 1 and Obs. 2 become 53.5 and 46.5, respectively, giving in the one case a deviation of + 3.5 and in the other — 3.5. The same thing will, of


90
80
70
60
50
40
30
20
10
Ayres.
Thorndike.
Deviations. 0-1.9. 2-3.9. 4-5.9. -7.9. -9.9. -11.9. -13.9. -15.9. -17.9. -19.9. -21.9 -23.9.

course, happen with every sample. Since the plus and minus signs are not significant for our present purpose, the deviation for each observer is the same.

The curves in Fig. 1 show the distribution of the 273 deviations for each scale. The vertical axis marks the number of deviations in each case, and along the horizontal axis the deviations have been assembled in equal steps, *i. e.*, those lying between 0 and 1.99, the smallest deviations, then those between 2 and 3.99, and so on. It will be seen that the deviations are considerably more scattered on the Ayres than on the Thorndike scale. The great majority of the deviations on the Thorndike scale lie between 0 and 9.99, whereas on the Ayres the curve does not ultimately descend until it has passed the 11.99 deviation point. The number of small deviations, *i. e.*, between 0 and 1.99, on the Thorndike is 69, and on the Ayres 64. There are 89 deviations between 2 and 3.99 on the Thorndike and only 79 between the same points on the Ayres. In both cases the actual number of zero deviations is interesting. They indicate the number of times that the observers graded the samples identically. On the Thorndike scale this occurred 60 times, on the Ayres 48 times, a difference of 12 times in favor of the Thorndike scale. The total deviation for each observer was, on the Ayres scale, 1254, and on the Thorndike, 987, a difference of 267 in favor of the Thorndike scale. The average deviation for the 273 samples was, on the Ayres, 4.6, and on the Thorndike, 3.6, a difference of one point in favor of the Thorndike, which is by no means a negligible quantity when we remember that 546 judgments were made by each observer.

With regard to the personal peculiarities of the two observers, it is interesting to note that Obs. 1 marked higher than Obs. 2 on the Ayres and Obs. 2 marked higher than Obs. 1 on the Thorndike. On the former scale Obs. 1 graded 145 of the 273 samples higher than Obs. 2, whereas the later graded 150 samples higher on the Thorndike. In spite of these personal peculiarities in marking, it would seem that the general higher grading of Obs. 2 on the Thorndike did not deviate so much from the average, as did the in general higher grading of Obs. 2 on the Ayres.

VI. Summary. In conclusion, it may be said that the results of the intensive study with 24 samples as well as the more extensive one with 273 samples go to show that the unavoidable deviations of individual judgments in the use of the two scales in question are much smaller on the Thorndike than on the Ayres scale. The Thorndike scale shows a greater degree of reliability, a greater uniformity in results. I believe this is due to the fact that it has taken into account all those factors that go to influence our judgment of handwriting, and does not depend upon legibility alone. The factor of legibility is undoubtedly the most important factor, but I believe we cannot, in judging handwriting, abstract from all the other factors and pay attention to it alone, at least not when we are judging handwriting by means of such handwriting scales.

Lastly, if there was any partiality in regard to any one of the two scales, it undoubtedly lay in most observers in the direction of the Ayres scale. In spite of this, the Thorndike shows the greater uniformity in judgment. The preference shown to the Ayres is due to the convenient form of the scale and to the percentage system of marking the steps. I certainly believe that the Thorndike scale could be made much more convenient for the user if the samples were placed horizontally instead of vertically, as at present, and the different steps more clearly marked off from each other. Whether the percentage system of marking the steps should be adopted or not is not of great moment, although we must bear in mind that the average teacher is more familiar with this method of grading than with any other.

COMMUNICATIONS AND DISCUSSIONS.

ON THE RELATION BETWEEN SPEED AND ACCURACY IN ADDITION.

A class experiment made annually for several years gives data corroborating the conclusion which I have elsewhere stated, that the sort of individual who is quick in adding is more accurate also than the one who is slow. Amongst the 671 students tested the variation in speed was very great. As shown in Table 1, the best 65 averaged 150 additions per 100 seconds, while the worst 20 averaged only one-fourth as many. These measures are reliable and are permanently characteristic, since with practice the difference is fully maintained. The 65 rapid adders made 7 errors per 1000 additions, while the 20 slow adders made 17½. The same relation is shown throughout the intermediate speed-groups, and is permanently characteristic there also.[1] I find this positive relation with all abilities that have been tested. The same individual may lose in precision by increasing his speed (though he will not always do so), but the sort of individual who is rapid will tend to be accurate also.

TABLE I.

The Relation Between Speed and Accuracy in Adding.

Number of individuals in the group.	Number of additions per 100 seconds (counting the time of writing the answers equal to one addition's time).		Approximate number of errors per 1000 additions—*i. e.*, wrong answers per 100 ten-digit additions.	
	Early.	Late.	Early.	Late.
65	150	162	7.0	3.8
108	108	120	9.1	6.5
86	88	99	10.3	6.7
115	75	87	12.0	8.3
109	64	75	12.7	9.0
103	55	66	12.6	9.3
65	46	58	14.4	10.5
20	37	46	17.5	14.4

EDWARD L. THORNDIKE.

Teachers College, Columbia University.

[1]The reader should, however, bear in mind that the difference in the table between 7 errors and 17.5 or between 3.8 errors and 14.4 does not mean that the slow group is 2½ or 3½ times as accurate. Seven wrong means 993 right; 17½ wrong means 982½ right. The 'times' judgment is unjustified.

ABSTRACTS AND REVIEWS.

THOMAS H. BRIGGS. *Formal English Grammar as a Discipline.* (In "Teachers' College Record," xiv, 4; Sept., 1913.) Pp. 93.

This is perhaps the most complicated investigation of the irritating problem of "formal discipline" that has thus far seen the light of publication. Dr. Briggs first formulated the disciplinary claims of formal grammar under nine heads: Discipline in ability to detect likenesses and differences; to test a definition critically; to apply a definition thoroughly; to construct a rule or definition; to test reasons; to select relevant data; to discard irrelevant data; to "reason" efficiently in other fields; to reason syllogistically; and to detect "tricks," "catches" and sophistries. He then constructed more than fifty problems and exercises, arranged in paired series, each pair testing in two slightly different ways one of the general abilities that formal grammar is supposed to train.

Two groups of seventh-grade children were chosen for the principal investigation. These groups were of approximate equality in number, age, general scholastic ability and other factors that might influence the test. The tests of the first series were given to both groups. Then one group was subjected to three months' instruction in formal grammar, taught somewhat inductively by Dr. Briggs himself. The other group had the usual work in "language and composition" in place of the formal grammar. At the end of the three months the two groups were re-tested with the second series of exercises (each of which was similar to its fellow in the first series except for the superficial differences introduced to eliminate the factor of memory). The two groups of pupils were then reversed, the grammar group having the composition and language for three months, the composition group receiving the drill in formal grammar. At the close of this second three months' period both groups were again subjected to the initial test which had been taken six months before.

The results are extremely complicated, but Dr. Briggs concludes that they do not justify a confirmation of the disciplinary hypothesis. In some cases a positive transfer was clearly demonstrated; in other cases there seems to be no gain; and in a few cases there was a positive loss. The clearest cases of a positive transfer were found in the exercises requiring a comparison of sentences to discover

wherein they were similar, and in the tests of ability to apply a definition.

As a supplement to the experiment the same tests were given to seventh-grade classes in five public-school systems, two of which "emphasized" formal grammar, and two of which did not. The conditions here are so complicated that little reliance can be placed on the results. So far as these results go, however, they substantiate the negative conclusions reached in the principal investigation.

This is an excellent piece of pioneer work and should be repeated in other grades—particularly in the high school. Subsequent reports, however, would be more valuable if the kind of training given in formal grammar and the kind of composition and language work were more minutely described. A great deal of the material formerly included in grammatical texts is now found in the language books. Dr. Briggs makes only a brief reference to the grammar teaching and nowhere refers to the content or method of the composition teaching. Many of the tests, while constructed with remarkable skill and cleverness, were not adapted to the age and maturity of the pupils. As a preliminary step to an investigation of this type, it would be well to have a thoroughgoing study of the relative virtues represented by the inductive and expository methods of teaching formal grammar. And certainly a period longer than three months should be devoted to the training series.

Dr. Briggs has not, so far as we can discover, reported two groupings of his data that should certainly be included in a study of transfer. The pupils who were tested in his principal investigation showed a range in age of from three to four years at the period of marked change in physical and mental characteristics. (The pupils ranged from 10.5 years to 14.5 years). Tables showing the distribution of gains and losses in respect of age would be of pronounced value in determining the bearing of Briggs' results on the contemporary theory of transfer. That is, if transfer is a function of the conceptualizing ability, a greater transfer would probably be found among the older pupils. Again, the pupils differed in "general" intellectual ability, and this was roughly measured by teachers' estimates. It would have been a simple matter to determine the distribution of gains and loses among the different ability groups. It may be that Dr. Briggs made these determinations, but we do not find a reference to them in this report.

One of Dr. Briggs' conclusions does not seem to the reviewer to be justified by the facts presented. A few tests were introduced to measure, not the transfer to other fields of the abilities supposed to be trained by formal grammar, but the influence of the outcome of grammar upon efficiency in English. In the principal investigation, the groups trained in formal grammar did slightly better in most of these tests than the parallel groups trained in composition and language. But in the supplementary investigation, made in five different city school systems, the reverse was true. Dr. Briggs maintains that the latter evidence is the more conclusive, and that "the advantage seems conclusively with the schools not emphasizing formal grammar." (P. 91). On a preceding page (p. 72), however, he has admitted that he knew little regarding the kind of instruction that these city systems offered in grammar, or what differences existed in the language work between the schools "emphasizing" grammar and the schools emphasizing "composition." He depended on "general traditions" and "statements of superintendents." He even says: "It is probable that the difference between the kinds is largely a matter of emphasis." In view of these statements, we are tempted to look upon the results obtained from his principal investigation as the more conclusive, and to suggest that formal grammar, in spite of its detractors, does function in the improvement of expression. W. C. B.

TH. RIBOT. *La Vie Inconsciente et les Mouvements.* Paris: Librairie Felix Alcan, 1914. Pp, iii, 172. Fr. 2.50.

The purpose of this work is to call attention to the preponderating role of the motor elements in unconscious activity (p. 1). The author proposes the hypothesis that *every state of consciousness is a complex of which the kinaesthetic elements form the stable resistant portion* (p. 19). To use the author's metaphor the kinaesthetic elements form the skeleton of consciousness. As consciousness tends to disappear the kinaesthetic portion of consciousness persists because more than any other mental phenomenon it organizes and solidifies itself (p. 77). It makes possible the total revival of past states and their multiple associations (p. 19).

In reviewing the different senses he finds that the motor elements play a very important part. In the case of the eye, for example, he calls attention to its many muscles which permit numerous and

delicate movements, and their important contribution to those qualities which we habitually think of as visual (pp. 21-22). In short, Ribot tries to show that every intellectual state (perception, image, concept) taken in isolation contains kinaesthetic elements more stable than the elements derived from the special senses (p. 39).

The third chapter is devoted to the problem of imageless thought. Condemning the vague way in which the word thought is being used, Ribot analyzes the thought process, and reduces it to the fundamental operations of analysis and synthesis. Taking Binet as a supporter of imageless thought, Ribot finds that in the cases that he cites there is no real thinking at all (p. 93). All the believers in thinking without images, he says, have taken an altogether too simple position. They confine themselves exclusively to consciousness. They forget the unconscious activity, the value of which is very great in promoting the work of thought in the absence of all conscious representations (p. 114). In conclusion he finds the hypothesis of a pure thought without images and without words barely probable, and in every case not proved (p. 115).

Incidentally Ribot suggests that this theory is due historically to the idealistic metaphysicians who have been led to assume it because of their turn of mind and the nature of their doctrine. It is for them the supreme form of knowledge, superior to the knowledge which is riveted to images and words. For them the pure thought reveals *l'Etre* (p. 99).

The last chapter is an interesting discussion of the problem as to whether there is a law of least effort which guides the life of man. Ribot finds plenty of evidence to substantiate this belief in the evolution of language, social institutions, religions and the arts. The causes of this tendency he explains physiologically and psychologically. Considered broadly, the resignation to work is a necessary condition for civilization. The love of work is unstable and precarious because it has been acquired late in the life of the race. The preferences for action or inaction he finally explains as being due to differences of temperament and character (p. 148).

American readers will be particularly interested in the number of American psychologists that are referred to in this volume. The book is interesting and stimulating, but one can not help but wonder why it contains no reference to Freud.

J. MACE ANDRESS.

State Normal School, Worcester, Mass.

THE
JOURNAL OF EDUCATIONAL PSYCHOLOGY
INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

Edited by

W. C. BAGLEY, C. E. SEASHORE,
J. CARLETON BELL, Managing Editor. GUY MONTROSE WHIPPLE.

Published monthly except July and August by
WARWICK & YORK, INC.,
BALTIMORE, MD.

Manuscripts for publication, books or other material for review, and news items of interest to educational psychologists should be addressed to The Managing Editor, J. Carleton Bell, University of Texas, Austin, Texas. Research contributions from England may be sent to W. H. Winch, Esq., Melville Villa, Overhill Road, Dulwich, London.

The Journal is issuing a series of Monograph Supplements for the publication of more extensive researches in educational psychology. For details prospective contributors may apply to Guy Montrose Whipple, University of Illinois, Urbana, Ill.

The price of the Journal is $2.50 per year of ten monthly issues. Foreign postage is 20 cents extra for Canada and 30 cents for other countries in the Postal Union.

Subscriptions and correspondence concerning business matters should be sent to Warwick & York, Inc., 19 W. Saratoga St., Baltimore, Md.

VOLUME V NOVEMBER, 1914 NUMBER 9

EDITORIAL.

CULTURAL EDUCATION.

To some refined and sensitive spirits who have taken great pride and comfort in their own early academic training, educational values are very much like religious values. They have become so much a part of the intellectual breath of life that any skepticism about them or any hint of change produces all the shock and horror of heresy or blasphemy. Some such perturbed state of mind is suggested by the leading editorial in the educational number of the *Nation* of September 10. A university professor, seeking a seminary room to investigate some recent literature on mathematical logic, finds himself in a room equipped with six gas ranges and a complete outfit of pots and pans. In an adjoining room he is confronted with a number of dress forms. Nearby, a class is engaged in trimming hats, another is absorbed in the complexities of bookkeeping, not far away he comes upon a class in lathe work, and as he hastens past another door he overhears instructions in cabinetmaking. All this in a college of liberal arts, where the work is offered for credit toward the A.B. degree! With

characteristic abstraction the professor forgets the object of his quest and falls to musing on the decadence of these modern times, and upon "the inflation of the A.B. degree." The objection seems to be not that these subjects may not be pursued with diligence and earnestness by the students (although there is some lingering doubt on this point); nor is it that they may not furnish an abundance of difficult problems which are worthy of the most strenuous intellectual activity. Rather it is that they lack the academic antiquity that would give them a rich intellectual heritage, and thus would entitle them to take rank with the classics and mathematics as constituents of a cultural education. On this account even their practical value is doubted. "The great question at present is whether a thorough general education, having for its chief aim mental culture and discipline (?), is not a better preparation for any walk in life than a specialized training." At any rate, their introduction into the college curriculum has completed the destruction of cultural standards begun by the admission of the sciences, and has given us a completely denatured A.B. degree. The writer calls for a revision and distinction of educational values and a more guarded definition of liberal culture, and urges the establishment of a college which would "restrict the courses leading to the degree of bachelor of arts to those of proved intellectual content."

We sympathize with the writer's distress at the loss of distinctiveness in the A.B. degree, but we see no hope of its restoration along the line suggested, for at the present stage of educational science we know of no method of determining "courses of proved intellectual content." The A.B. degree stands for four years of study beyond the high school, and that is about all one can say of it. If further differentiation is desired, why not indicate after it the field in which the major work has been pursued, as A.B. in Latin, A.B. in physics, A.B. in education, or A.B. in domestic economy? As to the matter of cultural education, we have long felt that a revision of this concept was urgently needed, but we strongly suspect that domestic economy, business administration, journalism, and the like, would emerge from the test with a higher cultural rating than mathematics or the classics.

J. C. B.

NOTES AND NEWS.

A CORRECTION.

In the supplement to E. A. Kirkpatrick's article, "Memorizing versus Incidental Learning," in the September number of this Journal, page 412, a typographical error resulted in the substitution of "any" for "one" in line 10, and made the statement somewhat misleading. The students of this division computed the answers for nine lines each day, but refrained from computing and tried to think of all the answers they knew in the tenth line.

The statement is frequently made that the tendency of higher education, and especially of graduate and professional education, is to delay the marriage of superior men, and that this occasions serious loss to the race. It has been urged that we ought not to prolong education past the early twenties, and that intellectual men should be encouraged to reproduce at the rate of four genrations per century instead of three, as at present. Mr. Casper L. Redfield of Chicago doubts, however, whether reproduction at the rate of four generations per century would really produce superior individuals, and in order to secure some evidence on the matter has offered through the Journal of Heredity to "donate one hundred dollars to the treasury of the American Genetic Association if it can be shown that any superior individual has his date of birth within one hundred years after the average date of birth of his sixteen great-great-grandparents." A further one hundred dollars is offered if it can be shown that any one of the two or three hundred exceptionally great men in history fall within the three-generation-to-the-century class. It is to be hoped that some enterprising geneticist will at least undertake the search, and let the world know the results of his investigations.

The Wisconsin Industrial Commission is endeavoring to ally the schools more closely with the industrial life of the community by organizing free employment bureaus in public schoolhouses, with the school principals as paid civic secretaries and managers of the bu-

reaus. This commendable innovation should have a twofold effect: It should acquaint school officials more intimately with the industrial activities into which school boys and girls will ultimately go, and for which the school should afford some preparation; and it will tend to modify school work so that it will be better adapted to the needs of the boys and girls who are to live and do their lifework in the community. Moreover, it will tend to make the school more of a social center, and will focus the attention of the community upon its needs and activities.

At the instance of Mr. Marcus M. Marks, president of the Borough of Manhattan, New York city, a new system has been adopted in the trial of those employes against whom charges have been made. In place of the old autocratic system in which the borough president was judge, jury and executioner, and under which the whole force of employes came to look upon him as their common enemy to be outwitted at any cost, charges are now tried before a jury composed of two employes chosen by lot and two officials representing the department. In this way every employe is made responsible to his fellows, and if convicted has no ground for complaint of unfair treatment. Trials so far held have resulted in conviction and dismissal. This plan would be an excellent one for school boards and school principals to adopt. In many cases it is felt that school officials are decidedly arbitrary in their methods, and this sows discontent and disturbs the efficience of the system. Anything that will make for teamwork and solidarity of feeling for the best interests of the school is an asset for the community, and such a plan would not only remove the suspicion and disquiet which are rife in many school systems, but would also lead the school officials themselves to regard their responsibilities from a more objective point of view.

Some weeks ago an examination was announced to fill the position of specialist in industrial education in the Bureau of Education at Washington, at a salary of $3500 per year. The duties of the position will include the study of vocational education, the collection and compilation of information on the subject, and the dissemination of information and advice to educational officials throughout the United States regarding the establishment of courses of study in vocational and industrial education.—*Science.*

The Prussian Academy of Science has offered a prize of 5000 marks for the best study of "Experience as a Factor in Perception." The articles may be written in German, Latin, French, English or Italian, and must reach the Academy by December 31, 1916.—*Science.*

The George Peabody College for Teachers has now received funds to the extent of $3,200,000. Of this, $2,000,000 will be set aside as a permanent endowment, and part of the remaining $1,200,000 will be used in the erection of new buildings. One of the new buildings now in process of erection is the Jesup Psychological Laboratory, which will cost about $75,000.

The North Carolina School for Feeble-Minded was opened at Kingston, N. C., July 1, under the directorship of Dr. C. B. McNairy. It is expected that a psychological clinic will shortly be established in connection with the school.

John T. Metcalf, Ph.D. (Yale), has been appointed instructor in psychology at Princeton University.

Prof. June E. Downey of the University of Wyoming has been granted a sabbatical year's leave of absence. Dr. Carl L. Rahn will have charge of the department of psychology during Professor Downey's absence.—*Psychological Bulletin.*

Dr. Robert M. Ogden of the University of Tennessee, secretary of the American Psychological Association, has been appointed professor of psychology at the University of Kansas.

Dr. Gardner C. Bassett (A.B., Clark, Ph.D., Hopkins) has been appointed professor of educational psychology at the University of Pittsburgh. Dr. Bassett was a Carnegie research fellow in the genetic laboratory at Cold Spring Harbor last year.

Dr. Truman L. Kelley (A.B., Ilinois, Ph.D., Columbia) has been appointed instructor in the philosophy of education at the University of Texas. Dr. Kelley was last year consulting psychologist at the Culver Military Academy, where he devised a series of mental tests for adolescents. He was later instructor in educational psychology

at Teachers' College during the summer session. He will have charge of the new psychological clinic which is to be established at the University of Texas.

Dr. Eliot Park Frost, instructor in psychology at Yale University, has accepted the position in psychology in the University of Tennessee made vacant by the removal of Professor Ogden to the University of Kansas.

Dean A. Worcester (A.B., Colorado) has been appointed associate professor of psychology at the University of New Mexico.

Dr. Thomas A. Lewis (A.B., William and Jewell, Ph.D., Hopkins) has been appointed professor of psychology and education at Denison University.

We note from the daily press that Dr. Frank W. Ballou, who was associated with Professor Hanus in the New York School Inquiry, is director of promotion and educational measurement in the Boston public schools.

Dr. William F. Russell, honorary fellow in Teachers' College, Columbia University, has been appointed associate professor of secondary education in the George Peabody College for Teachers.

CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

AMERICAN JOURNAL OF PSYCHOLOGY. Vol. XXIV, No. 1, January, 1913. E. O. FINKENBINDER. *The Curve of Forgetting.* 8-32. A retesting of Ebbinghaus' and Radossawljewitsch's work on forgetting. Fourteen college students learned lists of nonsense syllables and tested their retention by relearning after eleven different intervals from thirty minutes to three days. The curve rises very rapidly at first, then more gradually, and agrees in general with the results of the investigators mentioned.

FREDERIC LYMAN WELLS. *Practice and the Work-Curve.* 35-51. A critical survey of recent investigations of the work-curve, and a computation of the index of fatigue or endurance for five men and five women in a series of addition and number checking experiments.

No. 2, April, 1913. P. F. SWINDLE. *On the Inheritance of Rhythm.* 180-203. Analysis of the literature and experiments on four small children, ranging from five to eight years of age, lead to the conclusion that rhythm is acquired by each individual and is not inherited.

GEORGE VAN NESS DEARBORN. *Kinesthesia and the Intelligent Will.* 204-255. An extended theoretical discussion of the fusion of sensations and images in the control of movement, and an account of simple experiments with thirty-eight subjects in the reproduction of a complicated figure by kinesthetic control. The subject was blindfolded, the pencil and containing hand were conducted over the figure, and the subject (still blindfolded) was asked to reproduce the figure. The conscious control was almost invariably a visual image. The experiment offers interesting possibilities for a genetic study of the control of movement.

No. 3, July, 1913. M. E. HAGGERTY AND E. J. KEMPF. *Suppression and Substitution as a Factor in Sex Differences.* 414-425. Sixteen men and twelve women, college students, were tested with fourteen of the Woodworth and Wells association tests. The women excel the men from eight to fifteen per cent. in the cancellation, substitution, naming and directions tests, but in all the logical relations tests (opposites, verb-object, attribute-substance, action-agent and superordinate concepts) the men surpass the women. The authors think this is due to a stronger tendency on the part of the women to suppress the immediate association and substitute a "more fitting" one in its place.

M. E. DONOVAN AND EDWARD L. THORNDIKE. *Improvement in a Practice Experiment under School Conditions.* 426-428. Twenty-

nine fourth-grade boys were given thirty periods of practice (two minutes each twice daily) in adding columns of ten digits. There was an average improvement of 64 per cent. The initial score ranged from four to twenty-one examples done correctly in four minutes. Boys with high initial scores made as large gross gains as those with low initial scores.

No. 4, October, 1913. KARL M. DALLENBACH. *The Measurement of Attention.* 465-507. An elaborate investigation of the measurement of attention to auditory stimuli with controlled variations of pitch and intensity with and without distractions. Attention may be measured introspectively in terms of attributive clearness, and objectively in terms of reaction time. There are two types, the dual-level and the multi-level formation, which are true individual differences and do not depend on external conditions of observation.

DARWIN OLIVER LYON. *A Rapid and Accurate Method of Scoring Nonsense Syllables and Words.* 525-531. The method is described and sample scores for three observers are given.

H. L. HOLLINGWORTH. *Characteristic Differences Between Recall and Recognition.* 532-544. From a number of experiments it would seem that the two mechanisms act in "reverse directions." A single presentation has greater value in recognition, while purpose, intention and effort are more effective in recall. There is a definite recognition span, varying with the individual, the material and the conditions of the experiment.

EMILY T. BURR AND L. R. GEISSLER. *An Introspective Analysis of the Association-Reaction Consciousness.* 564-569. A study of the mental attitude involved in trying to conceal an object of thought.

MILDRED BROWNING, DOROTHY E. BROWN AND M. F. WASHBURN. *The Effect of the Interval Between Repetitions on the Speed of Learning a Series of Movements.* 580-583. A one-minute interval is more favorable to learning than no interval, and the more difficult the material the greater the value of the interval.

Vol. XXV, No. 1, January, 1914. EDMUND C. SANFORD. *Psychic Research in the Animal Field: Der Kluge Hans and the Elberfeld Horses.* 1-31. The belief in the wonderful reasoning powers of trained horses is very similar to the belief in the phenomena reported by the Society for Psychical Research. In both cases there is evidence of extreme sensitiveness to slight visual, auditory or other stimuli, but a more accurate understanding of the processes involved is hindered by the unwillingness of those concerned to submit to scientific tests under rigidly controlled conditions.

E. O. FINKENBINDER. *The Remembrance of Problems and Their Solutions: A Study in Logical Memory.* 32-81. An extremely interesting and valuable study of the memory of logical processes. Thirty-two problems, all of considerable difficulty, were presented to each of eighteen trained psychologists, and after the lapse of one month

recall was demanded. Detailed introspection was taken immediately after the initial solution and during or after the process of recall. The first stage is a consciousness of the task and an act of "searching." This is followed by imagery of various sorts, and some of these images are characterized by a "feeling of familiarity." Objects, words or images used in the solution are much more likely to appear in memory than "short cuts" or processes of the solution itself. Few unsuccessful trials are recalled. The visual image is the strikingly dominant feature of the recall.

No. 2, April, 1914. G. STANLEY HALL. *A Synthetic Genetic Study of Fear.* 149-200, 321-392. Fear is the anticipation of pain, just as hope is the anticipation of pleasure. The author considers the first appearance of pain in sentiency, then the vague and finally the clearly conscious anticipation of it. Shock involves fear on account of the inability to adjust to the suddenness of the situation. There is a detailed discussion of *pavor nocturnus,* the fear of falling, of getting lost, of close confinement, of an object such as a stick, a missile thrown, a point, an edge, or a string, the fear of snakes, of cats, and of persons.

JOHN MADISON FLETCHER. *An Experimental Study of Stuttering.* 201-255. The author sets himself three tasks: The description of stuttering in terms of its physiological manifestations, the enumeration and description of the associated mental conditions, and the part played by these mental states in the causation of stuttering. The article includes a detailed examination of the voluminous literature, and an experimental study of nine cases. There is a bibliography of 152 numbers.

No. 3, July, 1914. WILLIAM SILLIMAN FOSTER. *On the Perseverative Tendency.* 393-426. Experiments by the method of right associates and by the method of retained members lead to the conclusion that there is no evidence for an idea arising in the mind without the co-operation of associative tendencies. Not only is there no spontaneous recurrence of mental contents, but there is no reason to think that there is any spontaneous activity of the nervous system which would give rise to revival of previous experiences.

PUBLICATIONS RECEIVED.

(Notice in this section does not preclude a more extended review.)

JAMES C. BOYKIN AND ROBERTA KING. *The Tangible Rewards of Teaching. A Detailed Statement of Salaries Paid to Several Classes of Teachers and School Officers.* Bulletin 589, Washington: Bureau of Education, 1914. Pp. 456.

A mass of statistical information from which many interesting studies may be made. The greater part of the monograph is devoted to the salaries paid in public schools, but 47 pages deal with universities and colleges, and 24 pages with normal schools, industrial schools and special classes. There are digests of state laws relating to salaries, and 22 pages of bibliography compiled by Dr. Bird T. Baldwin and Walter B. Mohr.

WILLIAM PAXTON BURRIS. *The Public School System of Gary, Indiana.* Bulletin 591. Washington: Bureau of Education, 1914. Pp. 49.

Schoolmen everywhere who are interested in the fullest utilization of the school plant, and who are keenly desirous of serving the best interests of their communities, will welcome this authoritative study of the widely heralded Gary system. The author's report is highly commendatory of the work attempted and the methods used in carrying it out.

L. CELLÉRIER ET L. DUGAS. *L'Année Pédagogique. Troisieme annee, 1913.* Paris: Librairie Felix Alcan, 1914. Pp. 447. Fr. 7.50.

In accordance with the custom of the editors to present a discussion of some general aspect of education before taking up in detail the productions of the year, the present volume contains 48 pages on "Different Forms of the Educational Ideal." There are articles by W. Rein, G. Kerschensteiner and John Dewey. The remainder of the volume presents a splendidly annotated bibliography of the contributions to education during the year 1913. There are 2680 numbers, and the annotations are sufficiently full and detailed to give the reader a definite idea of the contents of each article. The *Année* is an invaluable reference work for every student of contemporary movements in education, and makes one wish that it might also be issued in English, following the precedent of the *Psychological Index.*

FANNY E. COE. *Makers of the Nation.* Cincinnati: The American Book Company. 1914. Pp. 384.

These delightful stories of the early heroes of American history are intended for pupils of the fifth grade, and carry out the recommendation of the Committee of Eight to lay the chief emphasis on the biographical element. They are charmingly told, and will make a strong appeal to the youthful mind.

JOHN G. COULTER. *Notes on Spring Term Botany and on High School Science in General. The Dangers of "Practical" Science.* The School Science Series, No. 2. May, 1914. Pp. 16. Ten cents.

A series of informal, intimate talks on the teaching of biological science in the high school. The author does not have much sympathy with the so-called "practical" science courses. Such courses are usually crowded full of an undigested mass of details which cannot be assimilated by the pupils. High school science courses need, above all things, to be well organized and to be adapted to the pupils' habits of thinking.

S. A. COURTIS. *Standard Tests in English.* Reprinted from the Elementary School Teacher, Vol. 14, No. 8, April, 1914. 374-393.

A detailed description of the tests with sample scores, and graphs of grade performances in each. The tests include handwriting, dictation, original story, normal reading, careful reading, and reproduction. The Ayres and Thorndike scales are used in the judgment of handwriting, but the author has not found it practical to employ the Hillegas scale for composition. The excellence of the composition papers increases quite regularly from the fourth to the thirteenth grade, while the mistakes in spelling fall off more rapidly than those in punctuation or syntax. While there is a considerable rise in the rate of normal reading, the rate of careful reading remains practically the same from the fifth grade on. A striking feature of the curves is the marked superiority of auditory over visual presentation in the accuracy of reproduction. Not only is the auditory presentation superior throughout, but the superiority increases greatly from the tenth to the thirteenth grade.

GEORGE V. N. DEARBORN. *Certain Further Factors in the Physiology of Euphoria.* Reprinted from the Psychological Review, Vol. 21, No. 3, May, 1914. 166-188.

The author believes that euphoria, or the general feeling of well-being, is conditioned upon the favorable action of three types of receptors: (1) The villi of the intestine, (2) the tonus and active contraction

of the voluntary musculature, and (3) the skin and mucosae as acted upon by the air through evaporation and oxidation. A detailed analysis of these various factors shows what a tremendously complicated affair it is to "feel well."

Fourth Annual Report of the Neurological Institute of New York, for the Year Ending November 30, 1913. New York: Published by the Institute, 1914. Pp. 47.

The report contains, among other interesting data, the report of the department of social research, including a description of the work attempted, some notes on the use of the Binet-Simon scale, with a critique of that scale, and a series of efficiency tests designed especialy for the pre-adolescent period. The latter include six groups of five tests each, as follows: I. Establishment of general habits and relations. II. Readiness in making new adjustments. III. Continuous effort in the process of adjustment. IV. Ability to construct under controlled conditions. V. Purposive control of the thinking processes. VI. Precision in dealing with likeness and difference. Many of the tests in these groups are taken from the Binet-Simon tests, or from other standard collections of tests.

Francis W. Parker School Year Book, Volume III, June, 1914. Chicago: The Francis W. Parker School. 1914. Pp. 188.

This volume, prepared by the faculty of the Francis W. Parker School, deals with "Expression as a Means of Developing Motive," and contains a general introductory article on expression in school work and its intimate relation to motive; an article on children's play as fundamental in education; one on oral reading; one on imaginative writing in school; one on the utilization of the dramatic instincts on the part of children in school work; one on clay modelling; one on metal-working, and one on art.

Henry Herbert Goddard. *Feeble-Mindedness: Its Causes and Its Consequences.* New York: The Macmillan Company, 1914. Pp. xii, 599. $4.00.

Through the widespread discussion and use of the Binet-Simon tests, and through the repeated and continued warnings from the platform and the press, the public has become pretty familiar with the dangers of feeble-mindedness and its liability to spread through the social body. And yet little has been definitely known as to the nature and causes of this sinister taint. The present splendid volume by the recognized authority in this field contains a full and complete discussion of the subject, and will undoubtedly remain the classic

treatment of the topic for many years to come. An introductory chapter on the social problems involved in feeble-mindedness is followed by a detailed study of the 327 cases of feeble-mindedness which have come under the author's direct observation at Vineland. In each case there is a general description of the subject's condition, an indication of the mentality in terms of the Binet scale, and as complete a heredity chart as can be constructed on the basis of the available data. The latter feature is a distinctive and very valuable one. There follow chapters on the causes of feeble-mindedness, as deduced from the data presented, its relation to other defects, as alcoholism, epilepsy, syphilis, tuberculosis, sexual immorality, insanity, etc., and the author presents and supports his theory that feeble-mindedness is a unit character tranmitted in accordance with Mendel's principles of heredity. The two concluding chapters deal with eugenics and practical applications of the general principles to social conditions. The book challenges the attention not only of the psychologist and psychopathologist, but of the educator, the social worker, the judge, and the legislator.

JAMES HINTON. *The Mystery of Pain.* New York: Mitchell Kennerley, 1914. Pp. 109. $1.00.

A mystical, philosophico-religious discussion of pain that was first published in London in 1866, and is now reprinted with a new preface. The book was written in the attempt to afford consolation to the sorrowful.

LEO HIRSCHLAFF. *Suggestion und Erziehung.* Berlin: Julius Springer, 1914. Pp. x, 245. M. 6.

This is Volume II of the series of "Monographs on the Borderland Region Between Education and Medicine," issued by Th. Heller and G. Leubischer. Part I presents a historical survey of the attitude of physicians, psychologists and educators toward the phenomena of suggestion and hypnotism, and Part II enters into an analytical and critical discussion of the nature of hypnotism, its results, its dangers, and its applicability to educational procedure. The final attitude of the author is the complete rejection of hypnosis as affording even helpful suggestions to the educator, and an arraignment of its procedure as opposed to the very essence of educational values.

ESTELLE M. HURLL. *How to Show Pictures to Children.* Boston: Houghton-Mifflin Company, 1914. Pp. 138. $1.00 net.

This excellent little book was written in response to the requests of parents, teachers, libraries and others for assistance in their efforts to teach children how to appreciate works of art. The author tries to get the children to see something of how pictures are made, empha-

sizes picture story-telling in schools, recommends the game of picture-posing to induce children to study the composition of pictures, and discusses several types of pictures that could be advantageously used with children.

WALTER A. JESSUP. *Economy of Time in Arithmetic.* Reprinted from the Elementary School Teacher, Vol. 14, June, 1914. 461-476.

Presents the results of a questionnaire to superintendents of all cities with a population of 4000 and over to find what topics should be stressed and what should be hurried over or eliminated in the arithmetic work of the elementary schools. There is a strong tendency to omit many sections of the traditional arithmetics, and to emphasize those phases of the subject that bear upon social and economic conditions.

JOHN COPELAND KIRTLAND AND GEORGE BENJAMIN ROGERS. *An Introduction to Latin.* New York: The Macmillan Company, 1914. Pp. xv, 261. 85 cents.

The authors believe that "syntax can be firmly grasped only through reading, and no more should be taught in the first year of Latin than is required to vitalize forms and make the student familiar with the constructions which he will meet most frequently in the second year."

KARL K. KITCHIN. *The Night Side of Europe.* Cleveland: The David Gibson Company, 1914. Pp. 196. $1.50 net.

The person who picks up this book thinking to find something very shocking will be grievously disappointed. The cover is indeed a bit glaring, but the chief impression gained from the interior is the appalling strenuousness with which modern society people strive to amuse themselves.

WILLIAM A. MCKEEVER. *Training the Girl.* New York: The Macmillan Company, 1914. Pp. xviii, 342. $1.50 net.

"Every phase of the life of the growing girl has received at least some measure of attention." The book is divided into four parts: Industrial training, social training, vocational training, and service training. It abounds in sound, simple, homely advice to parents and teachers, and each chapter is followed by a fairly representative bibliography for further reading. Nothing but good could come from the study of such chapters as "The Psychology of a Girl's Clothes," "The Girl and the Sex Problem," "Preparing the Girl for Motherhood," and "Serving the Common Weal."

HUGO MUENSTERBERG. *Psychology, General and Applied.* New York: D. Appleton & Co., 1914. Pp. xiv, 487. $1.75 net.

The author admits that it is not on account of any lack of text-books in psychology that the present work is offered to the public. Nevertheless, there are several reasons why there is a distinct need for this particular text. In the first place, the distinguished Harvard professor has published able and thoughtful discussions of the psychology of law, of medicine, of education, of industrial life, and of every-day affairs, but has nowhere set forth for English readers his views on the fundamental questions of psychology. Many of the readers of his former books have long desired a systematic treatise on psychology from his pen. In the second place, no author, with the possible exception of Miss Calkins, has endeavored to do justice in a single volume to both the individual and the social aspects of psychology. In this book the attempt is consistently and successfully made. Finally, and most important of all, no elementary text has ever offered so comprehensive a survey of the whole field of psychology in all of its branches as is to be found here. Surely in this day of incessant and productive research in all phases of psychology, there is need of a general text which will introduce the student in coherent and orderly fashion to all of the more important aspects of the subject. In this respect the present book is a pioneer, and on this account it deserves to be favorably considered and widely used.

J. PAUL NAYRAC. *Physiologie et Psychologie de l'Attention. Deuxième edition, revué et augmentée.* Paris: Librairie Felix Alcan, 1914. Pp. xii, 238. Fr. 3.75.

This typically French book, which was first published in 1906, treats not only of the physiology and psychology of attention, but devotes almost half its space to the pathology of attention, and to the means of restoring disturbed attention to normal conditions through processes of re-education. Although the book professes to be thoroughly revised, no account is taken of any work on the subject (other than the author's) since the appearance of the first edition.

GEORGE HOWARD PARKER. *A Brief Survey of the Field of Organic Evolution.* Reprinted from the Harvard Theological Review, Vol. 8, 1913. 35-46.

"The popular distrust which has recently arisen concerning evolution is based on a confusion of natural selection with descent. As to the effectiveness of the former the biologist has good reason for doubt, as to the reality of the latter he has none whatever."

GEORGE HOWARD PARKER. *The Origin and Evolution of the Nervous System.* Reprinted from Popular Science Monthly, February, 1914. 118-127.

Muscle originated before nerve, and the most primitive form of behavior shows slow propagation of impulses directly through muscle tissues. The nervous system gradually developed through the co-ordination and specialization of more sensitive cells, and served to unify and accelerate the reactions of the organism.

G. H. PARKER AND R. E. SHELDON. *The Sense of Smell in Fishes.* Bulletin of the Bureau of Fisheries, 1913. 35-46.

The distinction between smell and taste in man is one of degree rather than of kind, for in both cases the stimulating substances are dissolved on the surface of the sensitive organ and set up a chemical action. The essential difference is that the organ of smell is affected by much weaker solutions than the organ of taste. Fishes have well-differentiated taste and smell organs, and experiments indicate that the smell organs are sensitive to weaker solutions than the taste organs.

J. ADAMS PUFFER. *Vocational Guidance.* Chicago: The Rand-McNally Company, 1914. Pp. 306.

This is a book on vocational training rather than vocational guidance in the proper sense of the word, and contains a discussion of the principal phases of some of the more common vocations. It grew out of the author's personal experiences in connection with the Massachusetts industrial school for delinquent boys, where a consistent and determined effort is made to train the boy for some sort of productive activity. The discussion is not at all profound, but points the way to more intensive studies which are imperative before we can make much progress in vocational guidance.

LOUIS E. REBER. *University Extension in the United States.* Bulletin 592. Washington: Bureau of Education, 1914. Pp. 63.

This valuable monograph shows what the individual institutions are doing in extension work. There is a brief history of the movement, an account of the organization and administration in different schools, correspondence study, relation to elementary schools, extension lectures, local classes, debating and public discussion, and general welfare work.

Report of the Commisioner of Education for the Year Ended June 30, 1913. Washington: Bureau of Education, 1914. Vol. I, Pp. liv, 931. Vol. II, Pp. vi, 700.

There is such an abundance of good things in these two stately volumes that even bare mention of them is out of the question. Perhaps never before has the Commissioner's report been so representative of all phases of American education. School men all over the country should bring this report to the attention of their Congressmen and secure for the bureau adequate appropriations for the prosecution of its work. Among the constructive improvements advocated in American schools are more kindergartens, the rearrangement of the elementary and high school on the six and six year basis, the advancement of the teacher with the class, redirection of the work of the rural school, home gardening for town children, provision for school throughout the summer, continuation of education after leaving school for work, vocational education, county libraries, better articulation of secondary and higher education, better teachers, and better organization of education in Alaska.

Report of Mental Examinations by the New York Probation and Protective Association. New York: Published by the Association, 1914. Pp. 6.

One hundred and three out of one hundred and forty girls that came under the care of the association were tested with the Binet scale. Unfortunately, the author does not compute the mental age according to Binet's recommendation, but indicates only the most advanced group in which all the tests were passed. On this basis only one of the one hundred and three got beyond the ten-year tests. Yet the author says that only a small proportion of the whole number were feeble-minded.

PETER SANDIFORD. *The Mental and Physical Life of School Children.* New York: Longmans, Green & Co., 1913. Pp. xii, 346. $1.35 net.

This is intended as a textbook in psychology for those who are preparing to become teachers. Section I treats of the physical life of the child, including heredity and environment, growth, statistical methods, and medical inspection. Section II deals with the nervous system, and goes into the subject in much greater detail than is usual with educational texts. Section III presents dynamic or functional psychology, including instincts, habit, association, memory, suggestion, imitation, attention and interest. Section IV is entitled Descriptive Psychology (Why more descriptive than the above?), and

deals with perception, imagination and the emotions. Section V presents the psychology of babyhood and adolescence; section VI discusses exceptional school children, and section VII takes up the special subject of the development of language in children. The treatment is modern and strictly abreast of educational science, but one is moved to wonder at the inclusion of some of the topics.

H. L. SMITH AND CHARLES H. JUDD. *Plans for Organizing School Surveys, with a Summary of Typical School Surveys.* Thirteenth Yearbook of the National Society for the Study of Education. Part II. Chicago: The University of Chicago Press, 1914. Pp. 85. 75 cents.

A detailed outline for an educational survey, including school plant, organization, administration and supervision, course of study, the child, the teacher, and finances. There are nine pages of bibliography. Perhaps the most valuable part of the monograph is a summary of 20 recent school surveys.

JOHN SPARGO. *Socialism and Motherhood.* New York: B. W. Huebsch, 1914. Pp. 128. 60 cents net.

Many socialists have written against what they considered the barbarisms of marriage laws, and the idea has become prevalent that socialism is opposed to motherhood. The author shows that, on the contrary, the socialist would make all the resources of society converge on the elevation and glorification of motherhood. The mother, who is now shackled by the servile economic traditions of society, is to be freed from her bondage, and her functions are to be recognized as they deserve, as the highest service that can be rendered the State.

R. M. STRONG. *On the Habits and Behavior of the Herring Gull.* Reprinted from The Auk, Vol. 31, January, 1914. 22-49, 178-199.

The study includes a description of social relationships, feeding habits, breeding habits, voice, reactions to stimuli, and variability and modifiability in behavior.

CHARLES KEEN TAYLOR. *The Physical Examination and Training of Children.* Philadelphia: The John C. Winston Company, 1914. Pp. 99. $1.00.

Issued as "a handbook for medical inspectors, physical directors, teachers and parents." In the effort to be simple the author has made his book so elementary that it is scarcely to be compared with scientific works in this field. The frank attitude adopted with boys re-

garding the use of tobacco is commendable and refreshing in a book of this type.

CHARLES FRANKLIN THWING. *The American College.* New York: The Platt & Peck Company, 1914. Pp. 294. $2.00 net.

The author discusses the purpose of the college, the administrative force, including trustees, president and faculty, the problems of the student, the course of study and the principles for selecting courses, the conditions of college education in relation to society, and tests of results. The discussion of the latter topic gets no farther than the random testimony of graduates (selected, of course, for this particular purpose), and the extracts reveal a sublime faith in faculty psychology and in the general efficacy of formal discipline. One need only read a book of this type to appreciate what little effect recent educational investigations have had upon the average academic mind.

Vocational Guidance. Papers Presented at the Organization Meeting of the Vocational Guidance Association, Grand Rapids, Michigan, October 21-24, 1913. Bulletin 587. Washington: Bureau of Education, 1914. Pp. 91.

The papers are grouped as follows: I. The larger bearings of vocational guidance. II. Practical, scientific and professional phases of the work, including psychological tests in vocational guidance. III. Vocational guidance within the public school system. IV. How shall we study an industry for purposes of vocational education and vocational guidance?

ROBERT M. YERKES. *The Study of Human Behavior.* Reprinted from Science, Vol. 39, May 1, 1914. 625-633.

The author discusses human behavior from the standpoint of the student of comparative organic behavior. He emphasizes the value for an understanding of human behavior of experiments on the higher animals and on man under the same or closely similar conditions. In view of the resemblance of the anthropoid apes and of the higher monkeys to man, and of our ignorance in regard to their behavior in their natural habitat, it is proposed to establish a permanent station in some tropical country where, under favorable conditions, these animals could be bred, reared and observed. Data could thus be obtained and a technique perfected which could be used to great advantage in similar studies on children and adults.